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Contractors and Engineers Monthly

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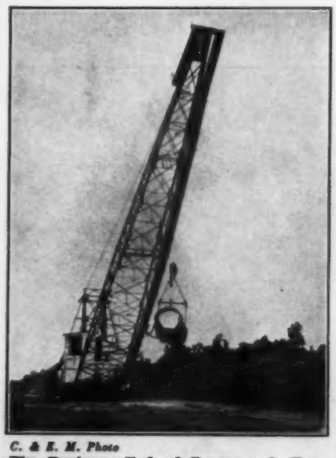
Highlights Of This Issue

- **Raised Center Strip in Mass.**
  A traffic-safety feature of a 2.7-mile highway contract north of Boston, Mass., which included a 40-acre borrow pit and two 30-foot penetration macadam roadways, was the 20-foot raised center grass plot to divide traffic moving in opposite directions.
  See page 2.
- **Another Flood-Control Dam**
  The early construction activities at Sardis Dam in Mississippi, the first project for the control of the floods in the Yazoo Valley, are described in this issue.
  See page 2.
- **Unusual Bridge Job in Oregon**
  The "hanging" of a continuous steel span on the Oregon Coast Highway involved some interesting methods for this type of bridge erection.
  See page 2.
- **Concrete Road Drainage**
  The use of drainage gratings in concrete and bituminous surfaced roads to take off accumulated surface water has met with great success in Missouri. The method of installing these gratings is described in this issue.
  See page 6.
- **Stabilization by Sub-Oiling**
  A series of projects over 20 miles of highways to test the efficiency of road base stabilization by sub-oiling with various materials was carried on by the Missouri State Highway Department last summer.
  See page 12.
- **Highway Lighting in Nevada**
  As part of five safety projects to eliminate grade-crossing accidents in Nevada, the State Department of Highways installed sodium-vapor lighting at the grade separation structures.
  See page 21.

ON A LOUISIANA LEVEE



C. & E. M. Photo
The Business End of Dameron & Kenyon's 6-W Monighan. See Page 31.

Powdered Asphalt Used in Road-Mix

Road in Wayne County, Ind., Paved for Five Miles with Unusual Black Top, Sealed With Torpedo Sand, Non-Skid

✦ NO matter how well a job is done there is always the chance that a slightly different procedure might make it better. That was the reason for a change in the timing of the seal on ½ mile of the 5-mile black-top road-mix job south of Centerville, Ind., by the Wayne County highway department under the direction of Ernest Coffin, County Highway Supervisor.

The old 18-foot road on a 35-foot right-of-way was a gravel job and had gotten into rather poor condition. It was graded and widened by WPA gangs to a 50-foot right-of-way in the latter part of 1936. The County then put down 250 yards of gravel per mile in the Fall and added 200 yards per mile more in the Spring of '37 as a precautionary measure because the old base was rather thin. This was maintained by a blade three or four times a week for four months before any work was

(*Continued on page 16*)

Method of Handling Largest Road Job In Southern State

(*Photo on page 48*)

C. & E. M. Photo
This Outfit Moved Dirt and Compacted It on Fills as Well

Chas. Weaver & Co. Handled Clearing to Finish of 32-Mile Job with Well-Planned Organization in Miss.

✦ BREAKING ground from the Natchez, Miss., end of a 32-mile series of four grading contracts with bulldozers, and then following up with a fleet of Carryall scrapers and an elevating grader and trucks, Chas. Weaver & Co., Inc., of Jackson, Miss., moved over 1,250,000 cubic yards of dirt, made several long fills, backsloped 35-foot cuts by machine instead of by hand and turned in a 17-month record for work accomplished between May, 1936, and October, 1937. The contracts from the north end at Natchez south to Woodville were: PWS 218B, PWS 53, PWS 41 and 41B. PWS 218B was finished and accepted in November, 1936, PWS 41B was completed and accepted in April, 1937, PWS 53 was ready for acceptance by the State Highway Department in July, 1937, and the fourth was accepted in October, 1937.

Method of Attack

The contractor started at the Natchez end with five LeTourneau bulldozers on Caterpillar Seventy-Five diesel tractors and knocked off the tops of all the sidehill and through cuts to a depth of as much as 40 feet in some cases where the distance the dirt was moved was not great. The bulldozers were followed up by five 12-yard Carryall scrapers for the longer hauls and the cleaning up was done with a Northwest dragline and Northwest 1¾-yard bucket. Although it was difficult to realize it, the slopes were not finished by hand but were smoothed to a fine finish by a special device thought out and built on the job as a result of the joint efforts of the various foremen and the Superintendent.

The equipment employed on the grading consisted of: five Caterpillar Seventy-Fives with LeTourneau bulldozers; five 12-yard Carryalls, two pulled by Caterpillar Seventy-Fives and three by RD8's; three RD7's with LeTourneau rooters and three Ateco sheepsfoot rollers. On grade finishing one of the RD7's pulled an Adams 12-foot blade,

(*Continued on page 14*)

A Divided Highway And Traffic Ovals

Arizona Highway Engineers Solve Unusual Traffic Tangle At Tucson Where Three Right Angles Occur

By E. V. MILLER, Engineer of Plans, Arizona State Highway Department

(*Photos on page 48*)

✦ LESS than eighteen months ago, the Planning Engineers of the Arizona State Highway Department were deeply engrossed in a problem involving two Federal routes and a state route, entering Tucson from the north, which required separation of truck traffic and passenger vehicles and must permit three right-angle turns within one mile. Right-of-way limitations drainage and a popular dance hall close to one intersection still further complicated matters. Today, the "Miracle Mile" is a reality with two 22-foot roadways, a central 38-foot planting strip, 8-foot 6-inch parking lanes on the outside of each roadway, outer planting strips and concrete walks all within a 130-foot right-of-way. This divided highway begins at the junction of U. S. 80 and 89 and State Route 84 and extends 2 miles south into the City of Tucson.

The Right-Angle Turns

One of the three right-angle turns within this project is inside the City of Tucson, at the intersection of Drachman and Stone Avenues. This was treated as a normal street intersection except that the curb radius was increased on one corner to 115 feet to maintain a faster traffic flow on the main route. No separation was attempted at this turn. The other two right-angle turns are T intersections and, as they are at either end of the divided roadway, are treated as modified traffic circles. Instead of a true circle these traffic loops are ovals 200 feet on the long axis and 120 feet on the short axis. This permits a much higher speed for major traffic and subjects only the minor traffic flow to the rotary principle. In order that traffic may merge into and flow out of the main stream, the roadways around the ovals are widened one full lane width. The transitions from the three to two-lane widths, or vice versa, are carried about 100 feet beyond the ovals on each intersecting roadway. This permits traffic to maneuver for position into the main stream without too much interference. Modified super-elevations are used on the curved roadways to accommodate reasonable speeds around them.

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A New Connection with U. S. Route 1 in Mass.

Double 30-Foot Penetration Macadam Lanes on Revere-Saugus Highway near Boston Completed by C. J. Maney

(*Photo on page* 48)

✦ THREE important, though relatively short, highway projects were completed last fall north of Boston, Mass. The first, featured in this article, leads from Revere Beach, the Coney Island of Boston's north shore, to a 200-foot traffic circle where it connects with a new section of U.S. 1 leading toward Portland, Me. A mile-long fill for the approaches to a railroad bridge and an overpass on the flat salt marshes, a 40-acre borrow pit, and two 30-foot penetration macadam roadways with a 20-foot raised center grass plot and granite curbs throughout, were features of the $825,000 project.

The One-Mile Fill

Before the mile of fill was placed, 2 feet of peat was stripped from the salt marsh with a Bucyrus-Erie dragline and later used for slope-dressing on the fill. It was during this operation that the contractor realized that there was good sound borrow material beneath the peat, resulting in the 40-acre borrow pit described below. A large portion of the fill material came from the rock cuts west of the fill. A total of 15 feet of the fill between the two bridges was composed of the rock from the ledge excavation with earth well mixed to give a solid embankment. Koehring Dumptors loaded by a Bucyrus-Erie shovel hauled the rock from the cuts about ½ mile to the fill. These four units hauled continuously during the rock work.

The maximum height of the fill was about 25 feet with side slopes of 1½ to 1 and 2 to 1 where the slopes were loamed. All material for the fill was end-dumped and then spread in 1-foot layers by two RD6 and one RD7 tractors with hydraulic bulldozers. The fill totaled about 354,000 cubic yards. After the fill had been completed it was necessary to excavate a trench 6 feet deep and 3 feet wide for a 12-inch concrete pipe through the fill near the maximum depth of the embankment. The layers of the fill were well defined and the sandy material stood well on a vertical face.

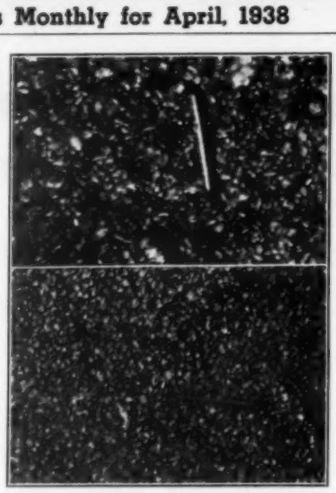
A 40-Acre Borrow Pit

When a good sandy material was discovered in the salt marsh beneath the 2 feet of peat, the contractor acquired two adjacent tracts for borrow pits totaling 40 acres. The area was stripped and excavated to a uniform depth of about 10 feet. Two 1½-yard Bucyrus-Erie power shovels were put into the pit with a Lorain 75D, loading out to a fleet of Mack and Autocar trucks with 6-yard bodies, all owned by the contractor. As a drainage ditch through which tidal water ran continuously was located close to the pit, the water level in the area of the borrow pit was only 2 feet below ground level or just below the peat. The water was maintained well below the level of the excavation by means of a sump and battery of pumps, consisting of a Sterling 6-inch, a Hercules 6-inch and a Rex 4-inch, located in a small house at the north side of the borrow pit.

Bridges

An overpass with ramps and a railroad bridge were included in this project. Borings made prior to the award of the contract made possible the selection of the proper type of piling and the borings were proved correct by the results of the pile driving. Both creosoted and untreated piles were used for the bridge foundations and the bearings were secured without any excess driving.

The railroad bridge over the tracks of the Boston & Maine consisted of three intermediate piers and two abutments with the railroad span 33 feet 9 inches long, and a span the same length over the creek included in the same structure. The end spans are 30 feet and the abutments are open. Steel sheet piling was driven at the railroad fill to hold the material back from the track area and to prevent possible slips due to the vibration of passing trains. The bridge carries two 30-foot roadways, a 5-foot center strip and two 6-foot sidewalks.

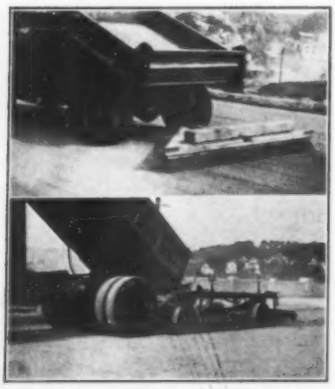


Above, the Texture of the Keyed Surface After Penetration. Below, the Finished Surface.

The beams are all of concrete, except for the railroad span which are steel stringers. The deck is an 8-inch concrete slab over the railroad span and 7 inches over the other spans. The steel stringers of the railroad span are Gunited for protection against the gases from the locomotives and also have blast plates immediately over the center of each track.

The Lynn Street Bridge, carried on a creosoted pile foundation, has a single span of 60 feet with 36-inch steel stringers and a 7-inch deck. The bridge carries two 30-foot roadways, a 5-foot raised center strip and two 6-foot sidewalks. Work on the fills and the bridges was carried on throughout the winter of 1936-1937 with the concrete being heated and protected during the periods of colder weather.

(*Continued on page* 11)



Above, the First Brooming of Binder Sand on the Bottom Course. Below, the Adnun Finish Spreader Laying the Surface Stone.

Sardis Dam to Assist Control of "The River"

Dikes, Çore Plugs, Coffer And Toe Drain Constructed While U. S. Engineers Built Dredge for Fill

✦ WORK at Sardis Dam on the Little Tallahatchie River, near Sardis, Miss., is spread over such a wide area that until the actual hydraulic work starts little activity will be apparent. This is the first project for the complete control of the floods of the Yazoo Valley. Sardis Dam will contain 12,500,000 cubic yards of hydraulic fill, to be placed by a single hydraulic dredge constructed on the site by the U. S. Engineer Department, and 2,530,000 cubic yards of rolled embankment. The outlet structures located on the south abutment will permit regulating the flow from the reservoir. An intake structure located on the upstream side of the abutment will contain gates for the safe release of the impounded flood waters through a tunnel to a stilling basin and thence via the hydraulic borrow pit to the existing river channel. A model of the proposed outlet structures is now under test at the hydraulic laboratory of the Mississippi River Commission at Vicksburg, Miss. A spillway will be constructed in the north abutment to protect the dam from overtopping.

The top elevation of the dam is 312, the dam and dikes will be approximately 14,550 feet in length, with a maximum height above stream bed of 117 feet. The work is being financed by $900,000 from the Emergency Relief Appropriation of 1935, and $5,100,000 from the War Department Appropriation Act. The estimated total cost is $14,000,000.

Contract Work

The dam is to be constructed in three sections, one on each side of the river and the middle section through which the river will flow until the outlet works are completed.

These sections will be hydraulic fill placed by the U. S. Engineer Department dredge. Before that work can be done, and during the construction of the dredge, certain other work was done under contract.

The Hooper Construction Co. of Jacksonville, Fla., was awarded a contract on May 27, 1937, for the preliminary work. This included the following excavation and fill: the stripping of the base of the dam to depths varying from 6 inches to 2 feet to remove all vegetable growths; partial excavation of the spillway site;

(*Continued on page* 27)

Contractor Speeds "Hanging" of Bridge

E. F. & W. F. Philpott Erects Continuous Steel Span on Oregon Coast Highway

By HENRY W. YOUNG

✦ THE CONTINUOUS-span type of bridge is so new that there is some little curiosity as to how contractors are getting along with its erection. One example of such construction is the Necarney Creek Bridge in Oregon, the first of its kind in that state. This bridge, the total span of which, center to center of the piers, is 92 feet, with a height above the stream of approximately 93 feet and a width of 26 feet in addition to which there is a cantilever sidewalk 3½ feet wide on each side, is built on a 10-degree curve and 6 per cent grade with a super-elevation of 0.11 foot per foot. The contract for its erection was awarded to E. F. & W. F. Philpott at a bid price of $83,205 and the concrete deck of the structure was poured last July.

The bridge, which was erected by the Oregon State Highway Commission with Federal-Aid funds, is located on the Oregon Coast Highway near Nehalem, just south of three remaining grade sections which, with the Arch Cape Tunnel (C. & E. M. Feb. pg. 27), when completed will provide a hard-surfaced roadway along the coast from border to border of the state.

Advantages of This Type

Under conditions calling for the erection of this type of bridge, there are a number of advantages in the construction of this type, in addition to the fact that it is simple and less costly to fabricate. The joints between the cantilever and suspended stringers take care of expansion and contraction effectively, which is one of the primary objects. Moreover, longer spans can be used, which lowers the cost of construction. In the case of single stringers from pier to pier, the deflection is of course greatest in the center between piers, with a certain permissible maximum. In the case of the continuous-span type, these deflections are broken up into several smaller ones.

The cantilever members rest solidly on the towers. The middle members are then hung from their ends. The tendency is for the ends of the cantilever members to deflect downward slightly and for the middle to arch up. The middle sections also deflect downward, but not so much as if they had to take up the whole length of the span. In the case of this particular bridge, the net result is that the total span of 92 feet could be accomplished with less total weight of steel for a given deflection than would have been the case with a single 92-foot stringer. Taking in-

(*Continued on page* 38)

Necarney Bridge on the Oregon Coast Highway

Still a "show street" after 9 years' hard wear

Traffic such as the above for a period of nine years is severe punishment for the best of pavements. In spite of it, the TEXACO Sheet Asphalt pavement on Main Street, Ashtabula, Ohio, is as smooth, easy-riding and good-looking today as ever. This continues to be a "show street" of the contractor who laid it.

Paving contractors everywhere east of the Rockies have found from years of experience that the TEXACO Asphalt pavements they lay today will be their "show streets" years from now.

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Shall We Have Toll Super-Highways?

A Symposium by Highway Authorities
On the Various Aspects of
the Bulkley Bill

While the proposal of transcontinental toll roads is not new, the subject has been revived recently by the introduction in Congress of a number of bills making such proposals. Among these is the bill (S 3428) introduced by Senator Robert J. Bulkley of Ohio, proposing a transcontinental system of super-highways, consisting of not more than three east-west and seven north-south routes, to be constructed as an unemployment relief measure and for the use of which tolls would be charged in order to make the projects self-liquidating.

In a special statement to CONTRACTORS AND ENGINEERS MONTHLY, Senator Bulkley states his position as follows:

"A national system of super-highways, such as I have proposed, not only affects some 30,000,000 drivers of automobiles and trucks, millions of bus passengers and shippers, but it also directly affects the welfare of that third of our nation which the President has described as 'ill-clad, ill-housed and ill-nourished.'

"Motorists, bus travelers and shippers long have needed continent-spanning roads that would save them time and money on long trips. It has not been generally realized what tremendous savings to drivers of vehicles such roads would afford. I feel certain the American public would be glad to pay reasonable toll charges if they knew the savings that would result from the use of smooth, many-laned highways which would eliminate curves as much as possible and in every case under-pass and over-pass other highways and lines of communication.

"We are in a business recession or depression. A super-highway system inaugurated with vigor this year would prompt a number of manufacturers to increase their production and therefore it would materially help the country out of the depression.

"Super-highways are bound to come. Now is the time to build them, because now we need greater work projects to meet a difficult unemployment situation. Industries and business supplying materials and equipment would receive a needed stimulus. Work would be provided for vast numbers on relief on WPA jobs. Critics say the government would be forced to spend staggering sums of money on an uncertain venture. I say money thus spent on improvements of lasting value is not misspent, and that if the highways are well planned they can be self-liquidating. In addition they will be of immense value to our national defense.

"My bill authorizes a $2,000,000,000 bond issue to begin construction of a national system of super-highways. Where these highways will go will be decided by the highway corporation created by my bill. I firmly believe the plan set forth is sound, and will prove so if tested."

Need for Such Highways

The first and most important consideration for a proposal of this type is, of course, whether or not we need such a system of highways. There has already been a vast expenditure of public money on public works projects, the practicability of which has been seriously questioned. In regard to the need for a system of super-highways, Charles M. Upham, Engineer-Director of the American Road Builders' Association, says:

"Forty million motor vehicles on the roads of the nation by 1940 was my prediction in a story recently released by the United Press. I also stated that eventually we would witness the completion of a system of motorways connecting the larger cities which would be paid for by assessing the motorists an extra fee for their use. Since that time there have been several bills introduced in the national Congress that call for the construction of a system of super-highways, or motorways. One of these bills has been given particular attention.

"The American Road Builders' Association represents the highway industry and profession of the nation and is a leading exponent of the belief that good and safe roads should be provided for each and every highway user throughout the forty-eight states. The majority of the main roads of the nation are fast reaching the point of obsolescence where they are a constant hazard to the daily increasing army of motorists who are forced to travel their antiquated surfaces. Fifty per cent of the traffic accidents that sent 40,000 men, women and children to their graves in 1937 could have been avoided by the type of safety construction that is undoubtedly planned for a super-highway system such as that proposed by Senator Bulkley.

"The American Road Builders' Association, however, does not recommend hasty embarkation on a program of super-highways in the state of unpreparedness that now exists. While granting that super-highways are much-to-be-desired and undoubtedly justified in some areas, the association does not advise the construction of even one of these super-roads until an exhaustive survey has been made of the entire country to determine between what points the possibilities for traffic-accident reduction and alleviation of traffic congestion will most economically justify the construction and maintenance of these highways."

A similar note of caution and the need for careful study of traffic requirements before embarking on any such extensive road-building program as is called for by the Bulkley bill is sounded by Alfred Reeves, Vice President and General Manager of the Automobile Manufacturers Association. Speaking for the Association, Mr. Reeves states its position as follows:

"The general attitude of the members of the Automobile Manufacturers Association is one of support for the construction of super-highways *only* if they can be economically justified.

"From the standpoint of safety and of expediting traffic, we feel very strongly that wherever possible, divided highways should be provided, and where traffic needs demand it, there should be segregation at intersections.

"However, there is a serious question involved as to the ability of the using public to pay the added tolls which would be required by the construction of a system of toll super-highways. It must not be forgotten that the motorists today are paying a toll at every filling station, as well as numerous other such taxes which in amount exceed one billion dollars per annum.

"The average motorist today is a man who has an income of less than $2,000 a year, who rarely travels more than 40 or 50 miles. To expect that the traffic over the transcontinental super-highways would defray the cost is to ignore facts of traffic movements developed in the Highway Planning Surveys of the U. S. Bureau of Public Roads.

"The subject is one which merits careful and complete study, with a view to finding the ways and means of providing the public, as rapidly as possible, with the best type of roads practicable under these limitations."

Will It Pay Its Way?

The next point to consider in this proposal for self-liquidating road-building projects is whether or not they will be self-liquidating. The novelty of Senator Bukley's proposal and, at first thought, its outstanding feature is not the suggestion that this country have a system of transcontinental super-highways but that a road-building program, which has over and over again proved to be the type of public works giving the maximum amount of employment per dollar spent, be instituted on a nation-wide basis to relieve the unemployment situation and, by a charge of tolls, be converted into a self-liquidating project.

But before such a proposal can gain the support of those truly interested in an intelligent road-building program, there must be a positive indication that such a system of super-highways will carry enough traffic to make them self-liquidating. In this connection, Arthur W. Brandt, Commissioner of the Division of Highways of the New York State Department of Public Works, says:

"Frankly we think the Bulkley bill is unsound. We can see no need for super-highways except in those congested sections of the country where traffic and safety problems warrant them. In the northeastern section of the country there is a definite need for super-highways on new location with limited access to relieve present main-line routes which are now overcrowded and dangerous and which, furthermore, can not be expanded into super-highways because of prohibitive right-of-way costs. But we do not believe that a toll highway will be self-liquidating.

"Assuming that one of these highways extended from Boston westerly to the Pacific Coast and passed across New York State parallel and close to the Mohawk Valley and its continuation through Buffalo, we are unable to agree, even with the most optimistic assumptions of travel, that such a highway would be self-liquidating. In fact, calculations we have made indicate that anticipated revenues would not pay more than half the amortization, interest and operating costs.

"If such a highway won't liquidate in New York State with its heavy concentration of population and its heavy registration of motor vehicles, how will it ever liquidate in the southern states or the states west of the Mississippi where the average traffic on most of the through routes is much less than in New York State?

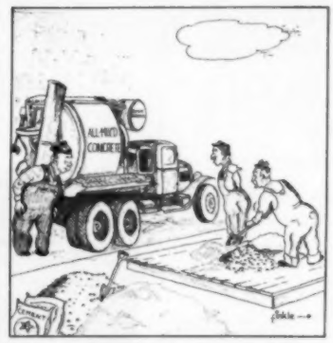
"As a means of relieving unemployment, I know of no public work which would equal it, but if the Federal Government decides to embark on the construction of super-highways aggregating some 20,000 miles in length, it should

(*Continued on page 36*)

Mississippi Highway Group Joins A.R.B.A.

Another strong and active group of highway contractors was added to the membership of the American Road Builders' Association recently when the Mississippi Highway Contractors' Association, Inc., voted to join forces with the A. R. B. A. in order that it might aid more forcefully in the campaign to build safety into the nation's highways and work more effectively for the continuance of an adequate highway program.

Officers of the Mississippi organization are: President, M. G. Cobb of Cobb Bros. Construction Co., Meridian, Miss.; Vice President, S. B. Ziegler, Ziegler Construction Co., Nashville, Tenn.; Secretary-Treasurer, Ellis Hoffpauir, Dunn Construction Co., Montgomery, Ala., and Jackson, Miss.; Executive Secretary, R. N. Kinnaird, of Jackson, Miss. The directors, in addition to these officers, are Frank A. Barber of Barber Bros. Construction Co., Baton Rouge, La.; John M. Harbert of Harbert-Cargile Construction Co., Birmingham, Ala.; C. F. Shuptrine of Shuptrine Construction Co., Natchez, Miss.; Wade E. Moore of Forcum-James Construction Co., Dyersburg, Tenn.; and Alex J. White of West Construction Co. of Tennessee, Louisville, Miss.



"You'll Have to Take It Back. He's a Conservative of the Old School!"

1939 Federal-Aid

On March 18, the Secretary of Agriculture sent letters to all the states, requesting that the proposed highway projects to be built with 1939 Federal-Aid funds now be submitted in order of their priority. The reason for this was that when the Secretary of Agriculture notified the various states of the apportionment of the funds for the fiscal year 1939, which was done as required by law before December 31 of last year, he requested at the same time that the submission of projects to be built with these funds be deferred, inasmuch as President Roosevelt was recommending to Congress that these appropriations be cancelled.

During the ten weeks of this year's session, no such action has been taken by Congress and, in fact, many members have seemed determined that some action be taken to release the funds promptly. It is so apparent that Congress will not curtail Federal-Aid funds for 1939 that the request has now been made that the projects be submitted promptly. As all these projects must be checked and approved by the Bureau of Public Roads, it is essential that all state highway departments send in their projects at once so that work may get under way as promptly as possible.

Dravo Gets Scow Contract

The Merritt-Chapman & Scott Corp. of New York City has recently awarded a contract to the Dravo Corp., Pittsburgh, Pa., for two steel dump scows of all welded construction, 206 feet long, 40 feet wide and 14 feet deep, each with nine pockets and 1,200 cubic yards capacity.

The first scow is scheduled to leave the Neville Island plant on May 15 to begin the long tow to Conneaut Harbor, Ohio, where it will first be used on the U. S. Engineering Project of deepening Conneaut Harbor. The second scow is to follow on June 2. While the distance from the plant in Pittsburgh to Conneaut Harbor is only 120 miles, the new scows must be towed many times that distance to reach their first assignment. The route is down the Ohio River, then the Illinois and Mississippi Rivers, through the Illinois and Mississippi Canal, and finally across three of the Great Lakes, Michigan, Huron and Erie, to Conneaut Harbor, Ohio, where they will be put to work.

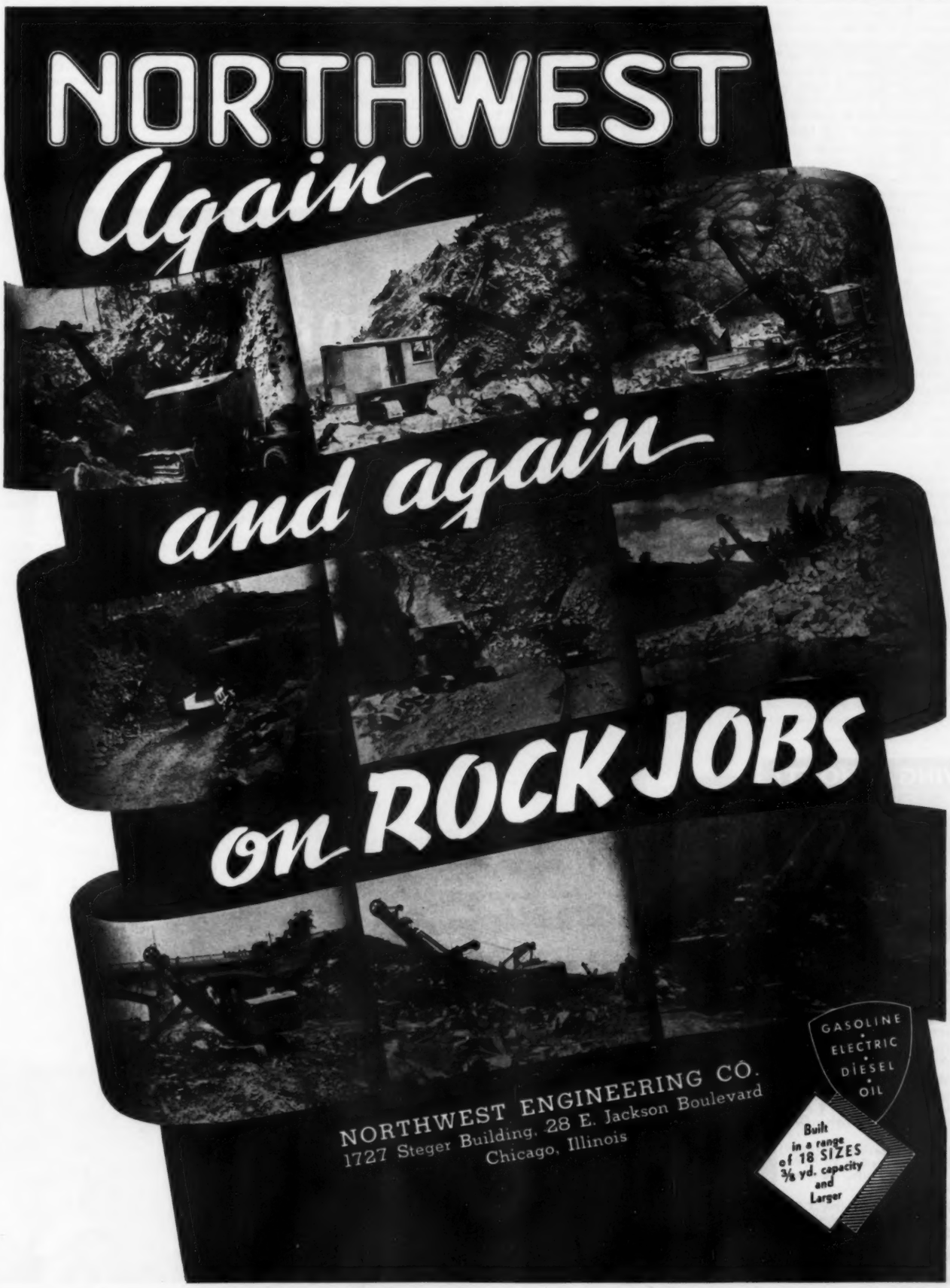
Chart of Safety Goggles

A chart which specifies types of safety goggles to wear for protection against eye hazards has just been completed by the Safety Engineering Division of the American Optical Co. Very concise and complete, this chart classifies eye-hazardous occupations by industries and recommends specific types of eye protection equipment which have been developed for each hazard, in an effort to reduce the annual 200,000 industrial eye injuries.

Copies of this chart may be secured by those interested direct from the American Optical Co., Southbridge, Mass., by mentioning this magazine.

New Clyde Dealer in Ohio

Announcement has been made by Clyde Iron Works, Inc., Duluth, Minn., of the appointment of the Lorenz-Wheeler Co., 547 W. Rich St., Columbus, Ohio, as exclusive distributor for the Clyde line of hoisting equipment in Columbus and surrounding counties.



Roads with Lip Curbs Have Improved Drains

Missouri Now Using Grating With Pipe Outlets Set in Road Surface, Or Opening Into Old Culverts

✦ A DISTINCT improvement in the drainage of concrete and bituminous-surface roads with concrete lip curbs has been made in the last twelve months in Missouri. In the rolling country through which U. S. 40 runs in the eastern part of the state, the use of lip curb is necessary on much of the road, resulting in a continuous trough 3 inches deep and the width of the road, with only such outlets as could be provided by paved spillways at the bottom of the hills. The improvement has been the placing of drainage gratings at frequent intervals to take off the water from the road surface at intermediate points to prevent the accumulation of water that inevitably results from the older type of drainage with spillways.

Construction of Drains

These gratings are 2 feet 6 inches by 6 feet in area with ½ x 3¼-inch bars spaced 2 inches center to center with cast-iron spool-shaped spacers. The bars and spacers are assembled with four ¾-inch rods running through the long way with nuts at the ends. This assembly makes it possible readily to remove the grating from the welded steel frame in which it is set for cleaning or repair. So that meddlesome individuals will be discouraged from removing the gratings, they are held in place by three ⅝-inch bolts set in the concrete at each end with plate washers and hexagonal nuts. The supporting structure is a 6-inch concrete curb all around the steel frame.

Where the gratings are set in the bottom of the hill they usually drain directly into the culvert, an opening being provided through the top of the culvert. On side hills and other places, concrete culvert pipe is set in the sub-base, permitting the water to drain off into the ditches at frequent intervals.

These installations have been made on two sections of U. S. 40, one in new concrete pavement laid last fall and the other in an asphalt top on a concrete base. In both cases the new road surfaces were laid over old concrete which had failed but which was adequate for a base course or foundation for the new pavement. This paving where the accompanying photograph was taken was near Danville, Mo., in the section where the asphalt top was laid.

C. & E. M. Photo
Typical Grating Installed on a Missouri Highway to Speed Removal of Water from the Road Surface

Ecuador Founds Road Co.

The Government of Ecuador has established a new profit-making company, Cia. Nacional de Careteras, to take over national road building and maintenance. All taxes formerly paid into the Road Fund, such as the gasoline taxes and one or two import duties, will be made over to the company which will build roads within its means and will also let out contracts to reliable firms.

This reorganization of finance is primarily to insure that Ecuador's share of the new Pan-American Highway will be completed, according to a report from the U. S. Bureau of Foreign and Domestic Commerce.

New Well Drill Catalog Issued by Bucyrus-Erie

The Bucyrus-Armstrong 21-W water well drill is described in a new bulletin issued by the Bucyrus-Erie Co., South Milwaukee, Wis., containing the complete story of all the working parts and features of the 21-W drill as well as field action photographs. Copies of this new Bulletin 21-W-2 may be secured by those interested direct from the manufacturer.

BUYING A HOIST?

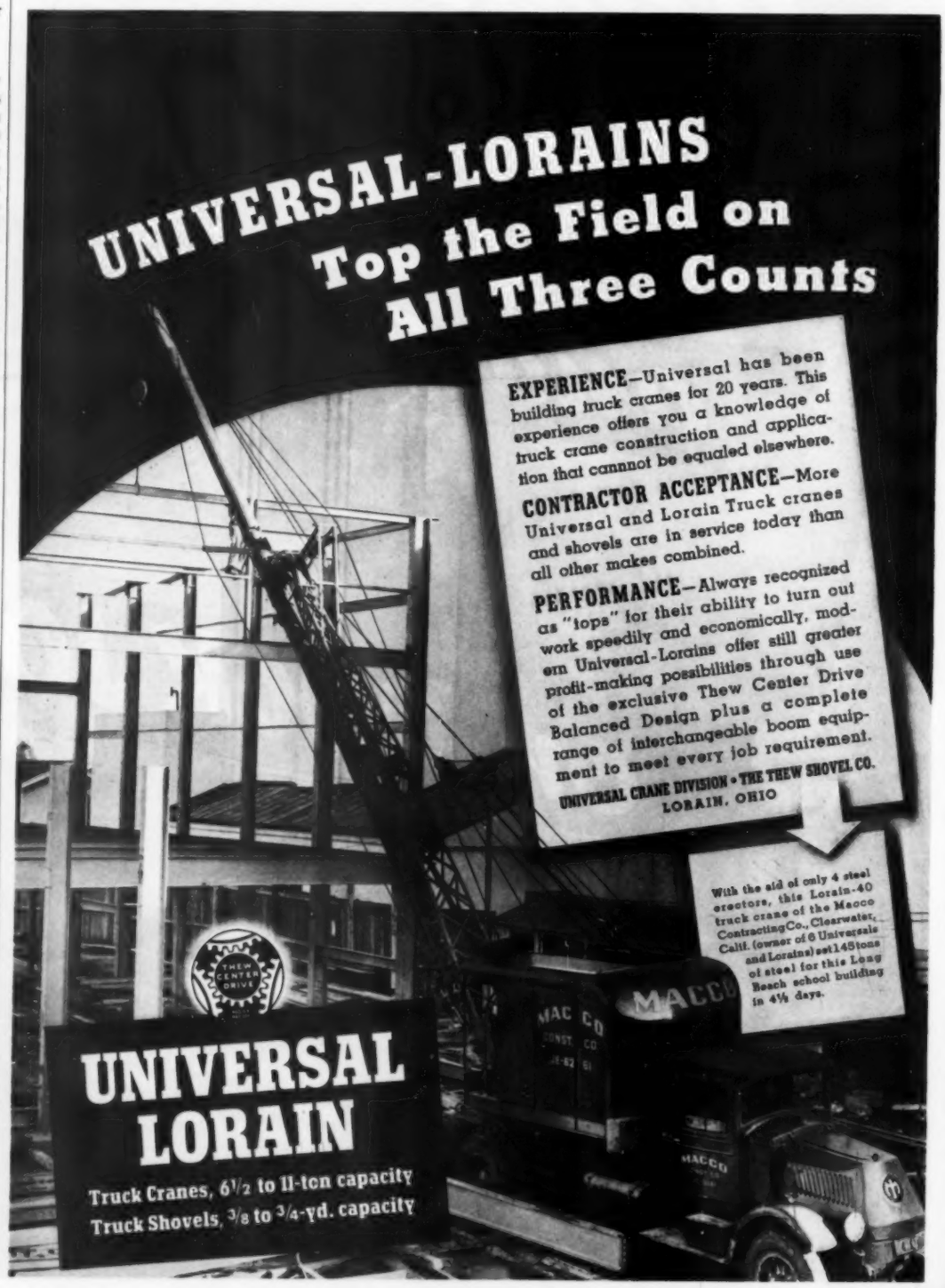
JAEGER Ball Bearing HOISTS up to 100 H.P. Offer . . .

- Finger-Tip Hoist Control (same as on $12,000 Shovels)
- Finest Double-Row, Self-Aligning Bearings,
- Machined, Balanced Drums
- Silent Chain Drive, Compounding Brakes, etc. 1, 2 or 3 drums (interchangeable), Gas or Electric.

Get our low prices on light 10-20 H. P. and intermediate 25 H. P. Screw Thrust Hoists. Send for Catalog H-37.

THE JAEGER MACHINE CO.
701 Dublin Ave. Columbus, Ohio

JAEGER


UNIVERSAL-LORAINS
Top the Field on
All Three Counts
EXPERIENCE—Universal has been building truck cranes for 20 years. This experience offers you a knowledge of truck crane construction and application that cannnot be equaled elsewhere.
CONTRACTOR ACCEPTANCE—More Universal and Lorain Truck cranes and shovels are in service today than all other makes combined.
PERFORMANCE—Always recognized as "tops" for their ability to turn out work speedily and economically, modern Universal-Lorains offer still greater profit-making possibilities through use of the exclusive Thew Center Drive Balanced Design plus a complete range of interchangeable boom equipment to meet every job requirement.
UNIVERSAL CRANE DIVISION • THE THEW SHOVEL CO.
LORAIN, OHIO
With the aid of only 4 steel erectors, this Lorain-40 truck crane of the Macco Contracting Co., Clearwater, Calif. (owner of 6 Universals and Lorains) set 145 tons of steel for this Long Beach school building in 4½ days.
THEW CENTER DRIVE
UNIVERSAL
LORAIN
Truck Cranes, 6½ to 11-ton capacity
Truck Shovels, ⅜ to ¾-yd. capacity

Special Motor Oil For Diesel Engines

"Lubrication is your biggest asset to offset your greatest liability—unnecessary repairs" says a manual on the maintenance of diesel engines put out by the Hercules Motors Corp. The recognition of the importance of proper lubrication by users of equipment has been indicated by the increasing use of carefully selected and regularly applied lubricants as well as by the production of special oils and lubricants to meet a variety of operating conditions.

A motor oil for use in diesel engines, known as Macmillan Ring-Free and produced by the Macmillan Petroleum Corp., 530 W. Sixth St., Los Angeles, Calif., has been given severe tests in the field and came through with a very satisfactory report from the contractor. Features of this Ring-Free diesel engine oil are its body which maintains a seal over friction points, its lack of carbon formation, penetration to all necessary points, resistance to extreme pressures and temperatures, resistance to wearing action so that it clings to friction surfaces, freedom from sludging tendencies, and non-corrosive properties.

The record of Macmillan Ring-Free motor oil in a diesel engine working 24 hours a day for 1,200 working hours on a large dirt-moving job and details of its properties and use are described in literature which may be secured by those interested direct from the producer by mentioning this magazine.

New Browning Crane Dealer

The Browning Crane & Shovel Co., Cleveland, Ohio, has recently announced the appointment of the Proctor-McNeel Equipment Co. of San Antonio, Texas, as its distributor in that section of the country.

Heavy-Duty Trailer Catalog

The complete line of La Crosse heavy-duty trailers, in a number of capacities up to 50 tons, is described and illustrated in a new catalog recently issued by the La Crosse Trailer & Equipment Co., La Crosse, Wis. These twelve different types of trailers are designed to meet all heavy-duty transportation requirements.

Copies of this catalog "La Crosse Heavy-Duty Trailers" may be secured by those interested direct from the manufacturer by mentioning this magazine.

PROVEN and RELEASED! • THE TAMPING – LEVELING FINISHER for Bituminous Road Construction

- Levels without forms
- Can lay to grade.
- Levels and compacts simultaneously.
- Permanent, more uniform density.
- Tamping greatly reduces and simplifies rolling.
- Makes possible very thin courses.
- Perfect matching of joints.
- Lays flush to curb.
- Thickness and crown under complete control—sudden changes impossible.

BARBER-GREENE'S Automatic Leveling is an outstanding achievement. So far superior, it is not even to be compared with the long wheel base principle. Tamping gives uniform density which will not reflect sub-grade irregularities under rolling or traffic. Depressions are automatically filled and tamped to level.

Practically automatic Thickness and Crown Controls make abrupt changes impossible—far excel anything ever developed in this connection. The thin mats that can be laid open up a new field in resurfacing.

After several years of developing, refining, and testing, we accepted orders in 1937 for selected jobs over the continent covering all types of work, as final proof. This Barber-Greene is now PROVEN and RELEASED as the only bituminous machine that literally FINISHES the road.

Dual controls can be operated from either side. Disintegrator added for extremely lumpy materials. Heat added for extremely tacky materials.

Preliminary data is now available. Phone, write, or wire. There is no obligation.

Complete literature on any of the above Barber-Greene machines will be sent upon request without obligation.

38-3

BARBER GREENE

485 West Park Avenue
AURORA, ILLINOIS

The 1938 Ransome Dual Drum Paver

New Dual Drum Paver Has Hydraulic Control

The latest models of the Ransome Dual Drum paver, made by the Ransome Concrete Machinery Co., Dunellen, N. J., are equipped with hydraulic finger-tip control and an automatic hydraulic feature. This finger-tip control includes the boom swing, discharge chute, transfer chute and water tank valves and the automatic hydraulic operation controls the discharge chute, transfer chute and water tank valves.

This paver is made only in the standard 27-E size, so that no change in a contractor's batcher plant, trucks, or batch boxes is necessary.

More Dump Trucks Go to Diesel Power

The practicability of diesel power for long-haul trucks has been established for some time. Savings of from 3 to 6 cents per truck-mile over other power are accepted and under average conditions the long-haul truck can save enough in fuel bills alone to pay off the cost of the diesel installation within 12 to 18 months. For short-haul work many have held the opinion that the diesel could not pay for itself.

From New York and Los Angeles construction circles come interesting accounts of change-overs to diesels in short-haul dump-truck service. Over 18 months ago we reported the B. Turecamo Constructing Co., of Brooklyn, N. Y. as buying two Cummins HB-4 diesels to replace gasoline engines in Mack chassis. The trucks were used to transport sand, gravel and asphalt from their main plant to various road construction projects. All of the work was within the limits of the city and the distances traveled averaged less than 15 miles per round trip. Fourteen months after installing the first two diesels they took stock and found that the diesels used but one third the number of gallons of fuel as the gasoline-powered trucks in the same work. The astounding revelation was that better time was made by the trucks, and that the two diesel-powered units covered nearly as many ton-miles as three gasoline-powered units. The result was that eighteen more Cummins HB-4 83-hp diesels were ordered for installation in new Mack chassis. The dump bodies from the older Mack trucks were installed on the new ones and the old chassis turned in.

In Los Angeles, Calif., Consolidated Rock Products Co. transported sand, gravel and cement from its bases to innumerable construction operations in the vicinity, mostly on short hauls. Instead of hauling 30,000 pounds payload as Turecamo did, Consolidated's truck and trailer rigs hauled 50,000 to 55,000-pound payloads with a maximum weight of 68,000 pounds. Six months ago Consolidated started with one HB-6 150-hp diesel and now has five in operation and three more scheduled for early delivery from Cummins Engine Co., Columbus, Ind. The diesel fleet is made up of GMC, Fageols and Sterling trucks, operating in a 50-mile radius.

As these facts come to us, another large California constructing firm has taken delivery on a Cummins-powered dump truck. The Griffith Co., a large contracting company, is replacing the engine in a heavy-duty Mack with a 6-cylinder Cummins diesel.

New Motor-Grader Catalog

Galion's complete line of motor patrol graders, the features of their design and construction, and their applicability to various types of road-building and maintenance jobs, are described in a new Catalog No. 200 recently issued by the Galion Iron Works & Mfg. Co., Galion, Ohio. Copies of this interesting and well-illustrated catalog may be secured by contractors and state and county highway engineers direct from that company.

Road Work in South Dakota

During 1937 South Dakota constructed 225 miles of improved earth roads, 135 miles of untreated gravel roads, 224 miles of low-cost bituminous-mix and 49 miles of concrete surfacing. The estimated work for 1938 includes 300 miles of improved earth roads, 70 miles of untreated gravel roads, 340 miles of low-cost bituminous-mix and 10 miles of concrete paving.

NEW 6" PUMP

Heavy-duty design. Ideal for wellpoint service, bridge pier holes, etc., when large capacity is required.

Compact design. Oil seal eliminating packing. Tremendous capacity—90,000 gph Automatic priming, without handles requiring adjustment. Easy accessibility.

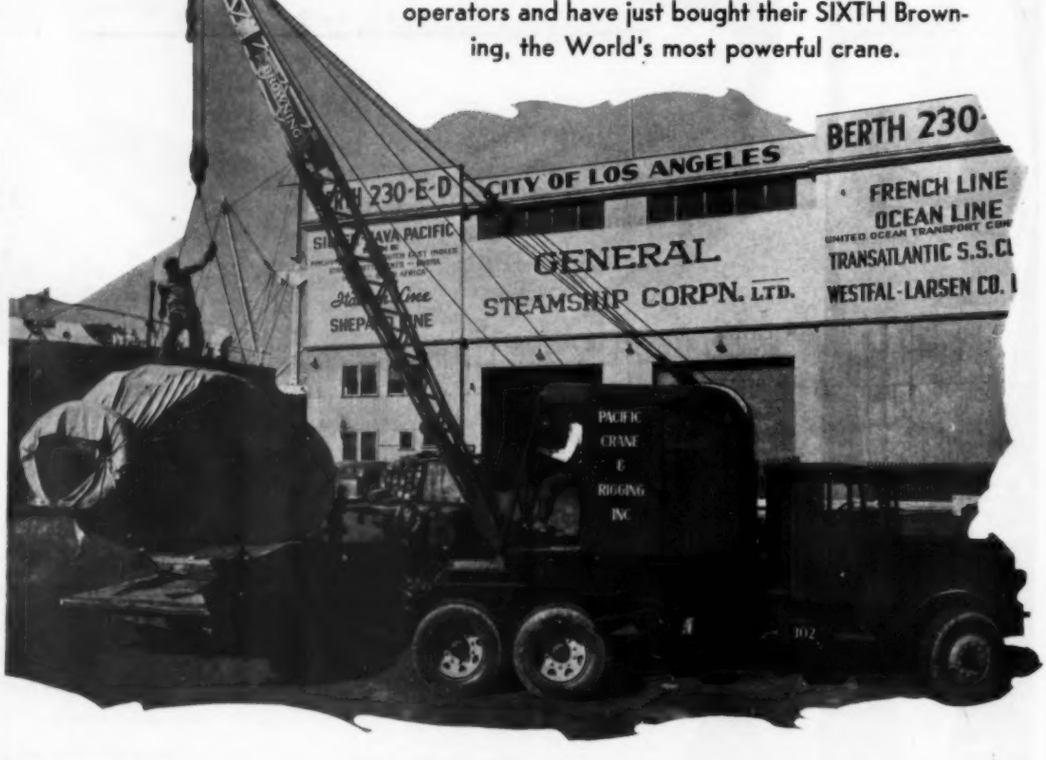
Ask for Bulletin CEM-38

MARLOW PUMPS

Ridgewood New Jersey

BROWNING

Pacific Crane and Rigging, Incorporated, speak well of this unit. They are the World's largest crane operators and have just bought their SIXTH Browning, the World's most powerful crane.



The Browning Crane & Shovel Co.

Established 1899

Main Office and Factory

16226 Waterloo Rd., Cleveland, Ohio

Export Department

30 Church Street, New York, U.S.A.

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CRANES
SHOVELS
DRAGLINES
ZEE ROTATORS

BROWNING PRODUCTS

DIESEL
GASOLINE
STEAM
ELECTRIC

CRAWLER, TRUCK AND WAGON
SHOVELS
DRAGLINES
CRANES - HOES

BROWNING PRODUCTS

DIESEL
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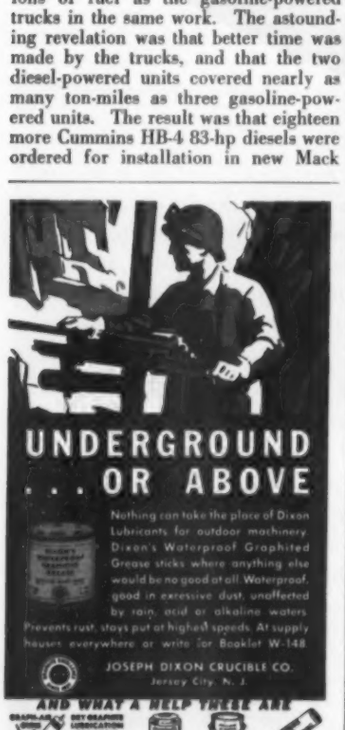
UNDERGROUND
. . . OR ABOVE
Nothing can take the place of Dixon Lubricants for outdoor machinery. Dixon's Waterproof Graphited Grease sticks where anything else would be no good at all. Waterproof, good in excessive dust, unaffected by rain, acid or alkaline waters. Prevents rust, stays put at highest speeds. At supply houses everywhere or write for Booklet W-148
JOSEPH DIXON CRUCIBLE CO.
Jersey City, N. J.
AND WHAT A HELP THEY ARE
SEND FOR CIRCULARS

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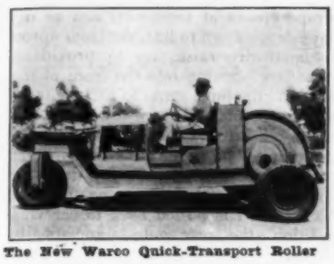


The New Warco Quick-Transport Roller

New Patch Roller Can Move Rapidly

At the Warco exhibit at the Cleveland Road Show, W. A. Riddell Corp., Bucyrus, Ohio, exhibited its new gear-driven road roller designed particularly for patch rolling. The unique feature of this roller is that in a very few minutes time a set of dual pneumatic-tired rear wheels can be lowered and the roller will then ride entirely on the pneumatic tires for quick transportation under its own power. The water-filled roll permits weighting the roller for desired compression.

Crankless Diesel In Production

The Sterling crankless diesel engine, the first of which has run over 9,000 miles in the yacht SILVERHEELS since early in 1936, is now in production. The manufacturer, the Sterling Engine Co., 1274 Niagara Street, Buffalo, N. Y., claims there are no limitations to the possibilities of this engine for any purpose for which an engine can be used, from the standpoint of aviation work, medium-weight streamline trains, submarines, and for heavy-duty work. This engine is a horizontal unit employing four cylinders with eight pistons working parallel to the main shaft. The power is delivered from the pistons through a Michell or Kingsbury thrust bearing to an inclined power disc, which is rigidly fixed at an angle to a straight shaft. This straight shaft is much stronger than a bent or crankshaft as used in conventional vertical engines. Cylinder heads, cylinder head gaskets, valves, camshafts, springs, rocker arms and tappets have been eliminated.

The center of gravity of this engine is lower than other types of engines of similar horsepower and speed. The pistons and connecting rods move horizontally. There is no angular motion to the connecting rod, which reciprocates in a straight line without any side pull on the piston, thus permitting the pistons to center in the cylinder, and their action does not disturb the piston rings.

The engine works on the 2-cycle principle but in the Sterling diesel the pistons perform the function of valves, uncovering the air-intake and scavenging the cylinders and also the exhaust ports in timed sequence, and not simultaneously as in a conventional 2-cycle engine. These Sterling engines provide a power stroke with each outward motion of the pistons. Since the pistons control the port openings, the benefit of the 4-cycle valve action is achieved without the use of poppet valves or springs or camshafts. Access to the interior of the engine is provided by four hand-hole plates, two on each side of the engine. The removal of these plates exposes the interior of the engine, and once the plates are off, the slipper bearings may be removed in two minutes each.

The forward end of the engine incorporates a 4-cylinder air compressor, single acting, and distributing the air by a rotary valve to the cylinders as the pistons uncover the intake ports, completely scavenging the cylinder and supercharging it with air at about five pounds pressure in controlled, rotational turbulence. The rotary valve does not touch nor seat like a poppet valve, but simply turns with the main shaft. The lubricating system provides for cooling and filtering all of the lubricating oil before delivery to the pressure system. The inclined power discs are lubricated by the spray of four nozzles which project the oil against the face of the disc before it rotates through the slipper bearing. These slipper bearings which transfer the power are identical with the thrust bearings used in hydraulic machinery turbines.

Electric starting of the new Sterling diesel is accomplished by a 32-volt starter with double throw switch. The first position of the starter switch employs 12 volts to engage the Bendix gear. The second position allows the full 32 volts to rotate the engine and starting is rapid as there is no cold surface such as the inner side of a cylinder head to interfere with the building-up of the heat necessary to provide good combustion.

Into the after end of the engine there is built a large reduction gear, the driven pinion being set in ball bearings. Several ratios are available. The engine speed may be transposed from 1,200 rpm to 1,000 or 800 or 600 or 520 rpm with various stock ratios. A Sterling-built multiple-disc clutch built into the after-end of the engine is substantially oversize and well-lubricated.

The current model of the Sterling diesel is a 4¼-inch bore, 5.45-inch stroke engine with a rating of 135 hp at 1,200 rpm and with an overload capacity and a marine rating of up to 150 hp. There is now under construction a 6½-inch bore, 8½-inch stroke engine with identical characteristics and an intended rating of 350 hp at 900 rpm. The stationary engine weighs 26 pounds per hp. A close regulated governor is provided to assure constant speed on various load changes, characterized by generating electricity where constant speed under low fluctuation must be maintained.

GRIFFIN
WELLPOINT SYSTEMS
33⅓% more efficient

The ONLY wellpoint with water inflow through entire screen circumference.
WHY?—Because no solid rods or flutes are used as separators!
Write for new catalog. "Pointed Wellpoint Facts"
GRIFFIN WELLPOINT CORP.
725 East 140th St., New York
Phone: MElrose 5-7704-5

Be sure it's the
GIANTGRIPT STRAIGHTEDGE
Either Steel or Aluminum
For Checking Concrete Surface
Two useable edges:—one sharp-cornered and squared for scraping; the other rounded for line-point straightedging.
ASK YOUR DEALER
L & M Manufacturing Co.
(Division of Moodie Forge Co.)
10302 BEREA RD., CLEVELAND, OHIO

MAKES WIRE ROPE *Hold Up!*

All exposed wire rope needs the protection of Texaco Crater. Crater is equally indispensable for open gears. It clings to gear teeth, quieting the noise, reducing the wear.

YOU can keep your wire rope in prime condition and be assured of long uninterrupted service . . . by treating it periodically with Texaco Crater.

Texaco Crater both lubricates and preserves. It coats each individual wire with a tough, viscous film that is weather-proof, rust-proof, water-proof. Lasts several times longer . . . makes your wire ropes last longer.

Many wire rope lubricants are costly to use because they throw off when run over small sheaves at high speed and permit extensive wear. Crater costs less to use because it *clings*.

Trained lubrication engineers are available for consultation on the selection and application of Texaco Industrial Lubricants. Prompt deliveries assured through 2108 warehouse plants throughout the U. S.

The Texas Company, 135 East 42nd Street, New York City.

TEXACO *Crater*

FOR WIRE ROPE AND OPEN GEAR TEETH

FREE BOOKLET. 32 pages of money-saving information for all who operate wire rope and large gear trains. Shows where to use Crater, and how. Illustrates simple, easily-built rigs for quick and easy application. FREE for the asking.

Unusual Ovals Solve Ariz. Traffic Tangle

(Continued from page 1)

Divided Roadways; Parking Strips

Between the two traffic ovals the project consists of two 22-foot asphaltic roadways separated by a 38-foot neutral zone. Flat ogee-type concrete curbs are used around the center parkways and standard 6-inch concrete curb with 8-foot integral gutter for parking on the proper side. The contrasting colors of the asphalt and the concrete will tend to provide a permanent division between the active traffic ways and parking strips.

The indented concrete parking strip, 8 feet wide, allows flat-to-curb parking in the usual manner. At the four corners of the side streets 7½-inch curb returns are used with a radius of 19 feet and a 2-foot gutter carries around to the end of the parking strip where an ogee transition connects the two. Surface drainage is carried in a straight line 2 feet off the edge of the asphalt traffic ways.

Drainage

Since there are no storm sewers in this section the drainage is passed under the roadway through ordinary concrete box culverts or pipes. The surface drainage is dropped into catch basins in the gutter line and carried to the nearest culvert. One rather complicated drainage situation at the north circle was solved by carrying an open ditch down the center parkway through the traffic oval and then parallel to the right-of-way to its outfall. This ditch was riprapped with broken concrete from the old pavement.

Landscaping and Signs

Landscaping is of an informal nature but unique in that native desert growth such as palo verde (Parkinsonia), greasewood, mesquite, and various cactii are used. A transcontinental telephone line has been moved one block east in order that beautification may be complete. A 5-foot concrete sidewalk runs the full length of the project.

Striping and the installation of directional signs are now complete and with the landscaping finished the project will have a much better appearance than shown in the accompanying illustrations.

Criticism and Praise

There have been both criticism and praise directed at the design of the "Miracle Mile." Since it is something new to the Arizona State Highway Department, criticism has been welcomed. The most prevalent of all criticisms from laymen seems to be directed at the curb returns or "indented" parking lanes. They think that people may drive into the curb returns thinking they have the right to travel in the parking lane when no cars are parked therein. The distinct difference in color between traffic and parking lanes should take care of this. As yet no accidents of this nature have occurred. It is being watched with interest for it is felt that this is one step toward the complete separation of traffic functions, in that high-speed, slow-moving, and parked vehicles some day must be separated completely for maximum safety and convenience.

New Buda Dealer in Canada

Announcement has been made by The Buda Co., Harvey, Ill., of the appointment of J. S. Innes Ltd., Bay and Yorkville Streets, Toronto, Canada, as exclusive representatives in the Province of Ontario for Buda gasoline and Buda-Lanova diesel engines. This company also handles other lines of equipment in which Buda engines are being used, including Cletrac Model AD and ED tractors equipped with Buda Model 4-DTC-196 diesels.

The North Traffic Oval at the Junction of Arizona Route 84 and U. S. 80 and 89, Showing Drainage Construction

New Hydraulic Scraper

One of the new pieces of equipment introduced at the Road Show was the new end-dump hydraulic-operated Carrimor scraper made by the LaPlant-Choate Mfg. Co., Cedar Rapids, Iowa. Designed for use with Caterpillar tractors, these scrapers are made in three sizes, Model C-4 of 3½ to 4½-cubic yards heaped capacity, Model C-5 of 5 to 6-yards capacity and the C-7 with 7 to 8-yards capacity. One of the features of these new units is the scientific design which, according to the manufacturer, reduces loading resistance.

Control of all operations is by means of one lever and one hydraulic jack. The scraper loads at the front, and as the bowl drops down to bite, the front apron automatically raises up to provide a large free opening into the front of the bowl. As the bowl starts to lift, the front apron automatically closes tightly to retain the full load. As the bowl passes to dumping position, the rear spreader gate automatically opens for dumping and spreads the load in a smooth layer. As the bowl is pulled back to carrying position, the rear gate automatically closes.

Model C-4 has an overall length of 12 feet 6 inches, an overall height in carrying position of 4 feet 7 inches and is mounted on two 11.25 x 20 14-ply rubber tires. Model C-5, which is 15 feet 2 inches long and 6 feet 6 inches high, is mounted on two 13.50 x 20 16-ply rubber tires, and Model C-7 has the same length and height and is mounted on two 15.00 x 20 18-ply rubber tires.

Complete information on these new Carrimor scrapers is contained in an illustrated circular, copies of which may be secured direct from the manufacturer.

Breezing along

AN UNUSUALLY TOUGH JOB at Jordan, N. Y.

When this Link-Belt K-45 Speed-o-Matic shovel went on the job, production went up and costs went down. Biting into red shale rock as hard as iron — digging into packed, cemented-gravel as abrasive as emery—swinging and dumping to the 8-yard trucks like clockwork, it loaded a truck every 39 seconds. That's Link-Belt Speed-o-Matic shovel performance — on this job by A. J. Leaf Co., Utica, N. Y., where the materials handled and the contract requirements proved too much for lever-operated shovels and their operators!

It will pay you to investigate the profit possibilities of Speed-o-Matic on your jobs. Send for a copy of Book No. 1795.

"I Take Off My Hat to Her"

"I take off my hat to her," . . . says Elmer Fargo, operator of A. J. Leaf Co.'s Speed-o-Matic Shovel, shown to the right. "Speed-o-Matic control is perfect, much faster than pulling levers. A twist of the hand with a movement of inches is far different from moving levers a foot. When I get off at night I wouldn't know I had done anything at all. I have accurate control of the machine at all times and with a lever type of machine often wondered what was going to happen. I throw it into a ram and it stays. After 13 years' experience on shovels, I'd say that power control will enable an operator to do twice as much work in a day as compared with a mechanical lever machine. I take my hat off to her."

LINK-BELT COMPANY

300 W. Pershing Road, Chicago

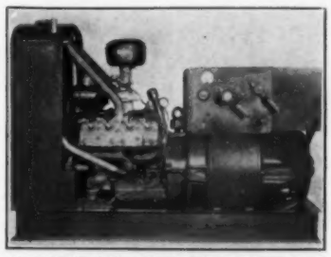
Distributors and Offices in Principal Cities

7308

New Portable Welder With Standard Parts

A new complete portable welder 24 inches wide, 60 inches long, and 43 inches high that can be loaded crosswise into practically any truck body has been announced by General Electric Co., Schenectady, N. Y. It consists of the improved WD-32B GE arc welding generator and a standard 60-hp Ford V-8 engine. Designated as Type WD-32BY, the new welder has a NEMA rating of 200 amperes, 40-volt arc, 1 hour, 50-C, 60 to 200 amperes welding range.

Features of the welder include self-excitation, duplex control, and self-stabilization. The heavy commutator on the generator furnishes reliable excitation without the use of any external exciter parts. Duplex control gives the choice of current and voltage adjustments that are essential to the best work under many varying conditions. The self-stabilization characteristic permits easy welding with any type of wire, either bare or shielded arc, and with any current or voltage adjustment.



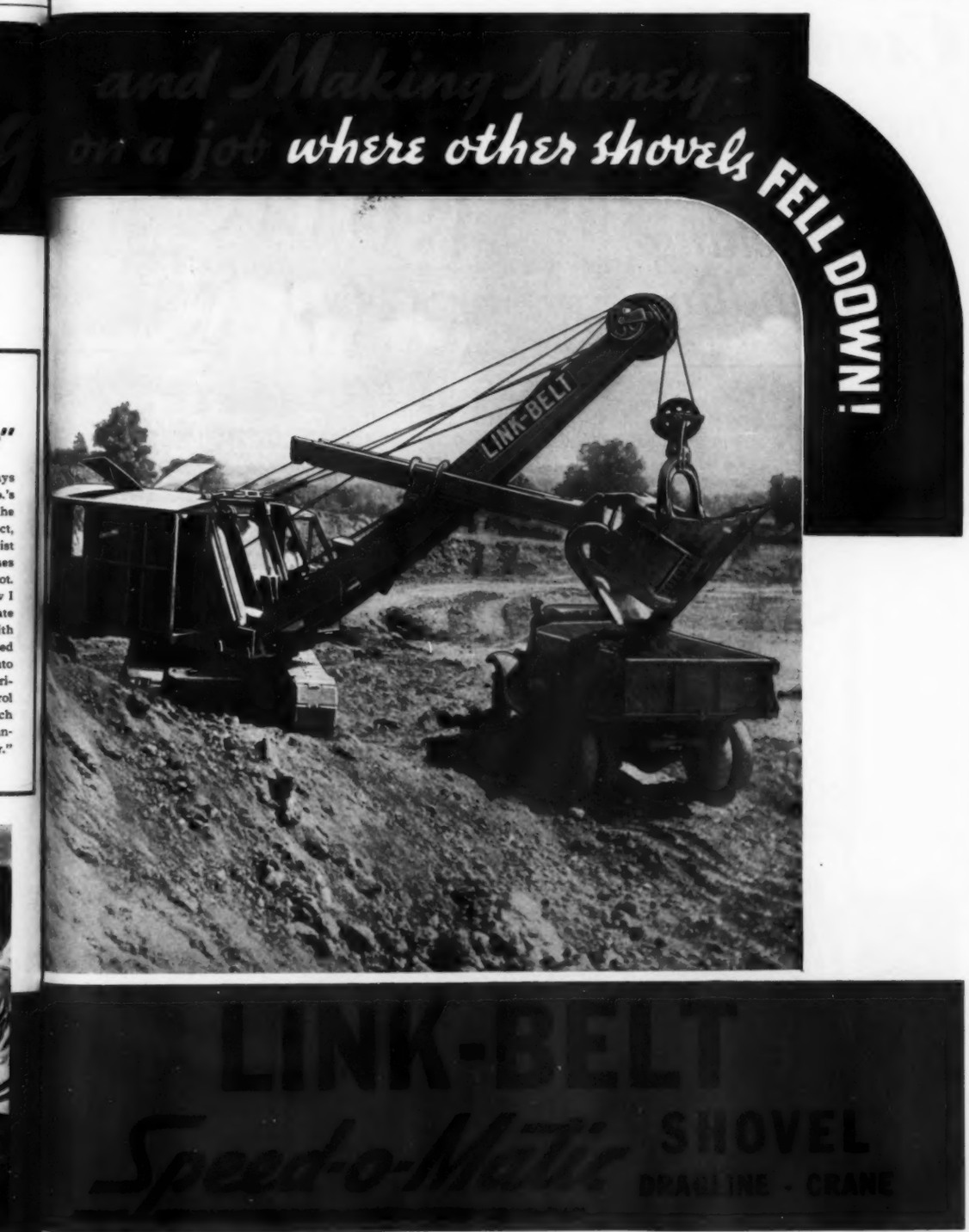
Operator's Side View of the New G-E 200-Ampere Arc Welder

Standard parts are used in both engine and generator, and ready accessibility makes maintenance easy. Ample power is provided by the engine even at the conservative operating speed of 1,750 rpm, equivalent to a car speed of 31 miles per hour. Less than two gallons of fuel per hour will operate the machine at full load. A special design of coupling, particularly compact and durable, is used to connect the engine crankshaft to the generator. Standard sets include electric self-starter, battery charging generator, oil-bath air cleaner, fuel pump, ten-gallon fuel tank, and vacuum speed governor.

New Tire Equipment For Motor Graders

The Caterpillar Tractor Co., Peoria, Ill., pioneer in the use of large single low-pressure tires on tandem-drive motor graders, has now adopted this type of tire as standard on its single-drive No. 10 and diesel No. 10 auto patrols. Careful experiments covering a period of more than a year have been made with the single-mounted low-pressure tires in order to develop a tire of proper size and to determine the correct inflation for the best performance.

It is claimed by this company that the single low-pressure tires give almost double the area of ground contact over dual high-pressure tires and therefore greatly increase traction.



New Mass. Highway Has Safety Features

(Continued from page 2)

The Raised Center Strip

Massachusetts was one of the pioneers in the use of the raised medial strip or grass plot for the separation of traffic going in opposite directions. Now all major traffic arteries are being built with this invaluable aid to safety. The Revere-Saugus contract called for a 20-foot raised separating strip throughout, except on bridges where the width was reduced to 5 feet and the strip was made of concrete for economy in the cost of the bridges.

Granite curbs 7 inches above the roadway surface and 6 inches wide were used at the outside of the roadway and sloped granite edging 6 inches high with a 12-inch exposed face was used on both sides of the center grass strip. Concrete edgestone was used for all curves, at crossovers and around the traffic circles. Particular attention was paid to the proper placing of the loam and so-called "non-leaching" material beneath the loam so that the grass would have the optimum chances for successful growth without watering which is an expensive operation for the maintenance forces of the highway division. The specifications call for a "non-leaching" material and those working on the project frequently referred to an "impervious" material. The term giving the proper connotation might better be "sponge-like" or "water absorbent" material for the idea of the lower layer is to retain the moisture that seeps through the layer of loam and hold it for the use of the grass as ground water when the rain retained in the loam has been used up by the grass. Very careful attention is being paid to this in Massachusetts by placing a soils expert on each project. The material used for the "non-leaching" layer was a peat which has the maximum of water-retaining qualities. It was placed from trucks and then spread in a 6-inch layer by an Austin-Western 77 dual-drive patrol grader. The loam was similarly placed and spread. In some cases the jack-of-all-trades Universal crane with a ½-yard Owen bucket, mounted on a Mack truck, reloaded the loam where there was an excess in one section.

The Traffic Circles

A traffic circle about 4,500 feet from the east end of the project cares for the traffic coming through Revere Beach from the Sumner vehicular tunnel from Boston and divides it into the flow toward the Newburyport Turnpike, U. S. 1, going north toward Portland, Me., and that going west toward Malden on Route 60. This circle is 150 feet in diameter and has precast concrete curb and a 30-foot roadway around it.

At the westerly end of the Maney contract, where it connects with U. S. 1, there is another larger traffic circle for the sorting out of vehicles, which is 200 feet in diameter and similarly has precast concrete curbs. Both circles have grass plots in the center treated with the peat and loam similarly to the center grass strips throughout the length of the highway.

Base Course and Bottom Stone

True to the principle of a sound foundation as the strength of a roadway surface, the Massachusetts Division of Highways places a gravel base under every foot of state highways. As a result of this policy over a period of years so that practically every foot of state highway has a natural gravel base or one placed during construction, there was not a single case of frost boil damage on a Bay State highway, constructed by the state, during the disastrous winter of

(Continued on page 22)

Sub-Oiling Method Of Stabilization

Twenty Miles of Base for Armor Coats in Experimental Sections Built in Missouri By Midwest Precote Co.

(*Photo on page 48*)

✦ A SERIES of Federal-Aid Projects between Keytesville and Marceline, Mo., was completed between September, 1936 and August, 1937, over 20 miles of roadway to test the efficiency of base stabilization by sub-oiling with various bituminous materials. The first gravel was placed during September, 1936, sub-oiling started September 8, 1936, and was completed October 28, 1936. Because of rain during the greater part of the two months when sub-oiling was in progress, and also because of the type of oil and cloddy subgrade, the bituminous materials did not disperse satisfactorily and work was shut down at the end of October, 1936. Reconditioning of the base without the addition of more bituminous material was begun July 2 and completed August 6, 1937, except for two stretches at the south end of the work where emulsion was used and no reconditioning was found necessary.

The results thus far seem to point to an advantage in the use of the emulsion as it tends to disperse more readily, particularly when water is added to the soil after the emulsion has been applied, and also to the need of doing this work with any type of bituminous material on a thoroughly broken up and mixed subbase and when the weather is very warm to permit the easy dispersion of the bituminous material through the aggregate.

Preparatory Work

Prior to the sub-oiling, the old 30-foot gravel road was prepared for the experiment with a 22-foot base and 20-foot armor coat by hauling in 17.4 tons of gravel per station and windrowing it. This amount was used to give a 4-inch center and 5-inch outside thickness of total gravel including the material in the old road. The material was bladed across the road and then the added gravel and the old road were scarified to the depth of the gravel to loosen it for the sub-oiling.

The Sub-Oiling Projects

Starting the study of the various projects from the north end of the work at Marceline, the length, material and rate of application were as follows:

FAP 337F—MC-3 cut-back asphalt was applied for a distance of 0.328 mile at the rate of 2 gallons per square yard for the 4 to 5-inch depth of loosened gravel. All materials, except the emulsions, were applied at this rate. The emulsion was varied to hold to the same asphalt content per square yard as with the road oils and cut-backs. The emulsions were applied at rates from 3.3 to 4 gallons per square yard and the tars at 2 gallons per square yard.

FAP 337A—This project had a total length of 4.209 miles. Coal tar was applied for approximately 0.4 mile with the application varied in three equal sections. In the first there were two equal applications of the tar at the full depth of the loosened material. On the second section the applications were divided between half at full depth and half at mid-depth. On the third section the two applications were made at mid-depth. The balance of this project was sub-oiled with MC-3 cut-back asphalt, except for 0.4 mile at the center of the project where water was applied in three experimental sections of equal length. On the first, water was applied with the MC-3 at the rate of 4 gallons per square yard, on the second at 3 gallons and on the third at 2 gallons per square yard. Following the sub-oiling and the application of water on these three experimental sections, a sheepsfoot roller and a pneumatic roller consisting of five and four pneumatic tires staggered, were used for six hours. Water was added to the soil after the sub-oiling on the east half of the road and at the same time on the west half.

The Ingalls Sub-Oiler Used by Midwest Precote Co.

FAP 337B—This project was 4.237 miles long. For the first 0.4 mile a 50 per cent MC-3 cut-back asphalt emulsion was used. On the next 0.8 mile a 60 per

(*Continued on page 29*)

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Truck Shovel-Crane

The Browning truck shovel-crane made by the Browning Crane & Shovel Co., 16226 Waterloo Road, Cleveland, Ohio, is carried on the truck by means of a structural steel subbase that provides all the reinforcing needed. The one operation of tightening the anchor screws gives the crane maximum capacity by eliminating spring action and tying the axle to the frame. By the use of out-riggers, the capacity of the machine is increased. The large-diameter cast-steel combination rotating rack and roller path reduces to a minimum the center pin load and insures easy rotation under all conditions. The Browning one-piece cast steel rotating base and cast steel side housings form the machinery frame, making an absolutely rigid foundation for the engine, drums, etc. Anti-friction bearings are used.

Made in three sizes, with diesel, oil-engine or gasoline-engine power, these units carry ½, ⅝, or ¾-yard dippers when equipped as shovels, or 25-foot and longer booms for use as a crane. These units are also equipped for use with drag buckets and back hoes. The unit can be mounted on trucks lighter than the standard 10,000-pound truck, with correspondingly lower lifting capacities. These units are equipped with a completely enclosed streamline housing, with ample doors and windows.

Complete information on these mobile excavating and material-handling units is contained in literature which may be secured direct from the manufacturer.

A Combination Hot and Cold-Mix Asphalt Plant

The new Cummer 1200 combination asphalt plant, recently announced by the F. D. Cummer & Son Co., Cleveland, Ohio, will handle 60 to 80 tons of hot mix an hour or 30 to 40 tons of cold mix an hour. The plant, which has two units, is easily set up and knocked down.

Features of the plant include a new and larger Cummer two-fire drier cooler, a 3,000 or 4,000-pound capacity mixer with roller bearings, a Robins variable-incline vibrating screen, a Cummer-General Electric timing device and dial scales for A. C. and aggregates.

Complete information on this 1200 asphalt plant may be secured direct from the manufacturer by mentioning this magazine.

"WE WENT THROUGH ROCK, MUD, HARD-PAN AND GUMBO ...without a headache"

A "Caterpillar" Diesel D8 Tractor and LeTourneau 12-yard carryall scraper pulling out for the haul. Three other identical outfits are employed on this project.

A "Caterpillar" Diesel D7 Tractor and cable-controlled LeTourneau ripper loosening hard-pan (close-packed rock, clay, slate, etc.) for the carryall scrapers.

A "Caterpillar" Diesel D8 Tractor with a loaded LeTourneau carryall scraper approaching the dump. (Illustration shows cut and fill work nearing completion.)

As a contractor or highway engineer, you know how unexpected rock or other snags can play havoc with costs, throw work programs out of gear, and send penalty shivers up and down your spine. Though such and other unforeseen difficulties are encountered on this safety-intersection project—wisely planned by the State of Iowa—they are not deterring Contractor Sears. For *all the earth-moving equipment on the job is "Caterpillar" powered.*

Slate, rock and hard clay raise their challenge, but a powerful "Caterpillar" Diesel D7 Tractor, pulling a cable-controlled ripper, quickly loosens the material and enables the four D8 Tractors and LeTourneau carryall scrapers to pick up the tough dirt and hurry it away.

So, too, with sure, steady, economical "Caterpillar" Diesel power do bulldozers, graders—and additional scrapers—perform their respective tasks with so little delay or time-out for repairs that the whole huge job of moving 700,000 yards is holding right to schedule . . . "without a headache."

Mr. Sears says further: "In equipping our outfit, we kept in mind the fact that we must have large yardage-producing units with versatility and adaptability. Our experience has proved our wisdom in the choice of 'Caterpillar' Diesel Tractors and Scrapers. On this project with this equipment, we are handling profitably material which otherwise would necessitate our using a variety of other, less economical methods. After thousands of hours of heavy-load operations, 'Caterpillar' Diesels have thoroughly proved their dependability. We are more than pleased with the service this equipment is giving us."

CATERPILLAR TRACTOR CO.
PEORIA, ILL.

DIESEL ENGINES • TRACK-TYPE TRACTORS • ROAD MACHINERY

Grading 32 Miles On Miss. Highway

(*Continued from page 1*)

and a Cletrac 40 pulled a 5-yard Austin-Western 5-yard scraper. A Caterpillar Twenty-Two with a Caterpillar 7-foot blade grader worked on the slopes and cut the surface ditches, assisted by three teams of mules, with some hand labor on the ditches at the toes of the slopes.

Particular attention was paid to the disposal of surface water on this job as the drainage was large and the great volume of surface water, if not carried to natural streams at the earliest opportunity, would have resulted inevitably in serious erosion.

The material encountered consisted of loam, clay, sugar sand, pipe clay, clay and gravel mixed, and a small amount of rock which was so badly disintegrated that it was knocked out with the bulldozers. Whenever sand was encountered it was necessary to have 2 feet of cover in the fills and when it was encountered in the cuts at grade it was undercut to a depth of 2 feet, wasted, and the grade backfilled with acceptable material. The contractor was not called upon to gravel the grade but in more than one place when a streak of good gravel was met in a cut the material was saved and used to top off the fills, resulting in a better surface less liable to wash in the period before the job was surfaced under some later contract.

The fills were built up in 6-inch layers by the Carryalls with the maximum fill reaching 67 feet and the next highest 60 feet. The Carryalls were worked mostly at hauls up to 1,000 feet as being the most economical distance but in a few instances they were worked on hauls up to 3,000 feet because it was cheaper to use the scrapers than to bring back other hauling equipment that was working some distance away. This was particularly true on the extension of one of the fills mentioned later in this article.

After making an estimate of 270,000 cubic yards in one month in the fall of 1936, the contractor shut down the grading for the winter but kept most of his regular and skilled men. The winter was spent in putting in 4,000 yards of culvert concrete, using two Rex and one CMC 2-bag mixers.

Several of the larger cuts washed badly in the spring rains on a 1 to 1 slope and the contractor was instructed to lay them back to 2 to 1 slopes which resulted in a considerable extra yardage of material to be disposed of at the toes of the spoil piles. All fill slopes and the 2 to 1 cut slopes were sodded with Bermuda grass.

Shifts and Labor

The job was run six days a week in two daily 10-hour shifts from 7 a.m. to 5:30 p.m. and 6 p.m. to 4:30 a.m. The contractor was able to secure a release on all skilled labor permitting work on a 10-hour shift. The common labor worked 8 hours a day.

As minor evidence that the contractor looked after the men, equipment and mules working for him, there was a special feed wagon for the mules spotted close to the point where they were working each day. It consisted of an old trailer with a rack on top for the hay and a large water trough at one end which was filled by one of the water trucks that traveled the length of the job watering the grade to keep down dust and assist in compacting the surface.

Homochita and Buffalo Fills

A 2-mile fill divided by the Homochita River was built up with earth from side borrow pits on either side of the fill itself and then topped off with clay from the cuts at either end of the fill. An Austin-Western elevating grader with hydraulic control pulled by a Caterpillar Seventy-Five diesel and having a 48-inch belt handled all the work of loading the fleet of twenty-four International C40 and two White trucks owned by the contractor and used for this fill.

The Buffalo River fill was built in much the same manner. It was about 1 mile in length and the 75,000 cubic yards was taken from side borrow pits and then topped with material from selected borrow pits nearby. The elevating grader was used in the side and selected borrow pits for loading the trucks.

The contractor for the Buffalo River Bridge was given a change order shortening the length of the structure so that Weaver was required to extend the fill at one end. This work was done by a pair of 12-yard Carryalls and one Ateco sheepsfoot roller for compacting the fill. Another Caterpillar tractor was used for the LeTourneau bulldozer which completed the spreading of the material on the fill.

Finishing Slopes

With an almost unprecedented area of slopes in the cuts to be finished and on 1 to 1 slopes, the contractor was faced with a real economic problem. Hand labor would have taken many months to complete the work with questionable results. After several conferences the foremen and Superintendent decided to try dragging the slopes with a railroad rail and the result was so encouraging that it was decided to extend the experiments along this direc-

(*Continued on page 32*)

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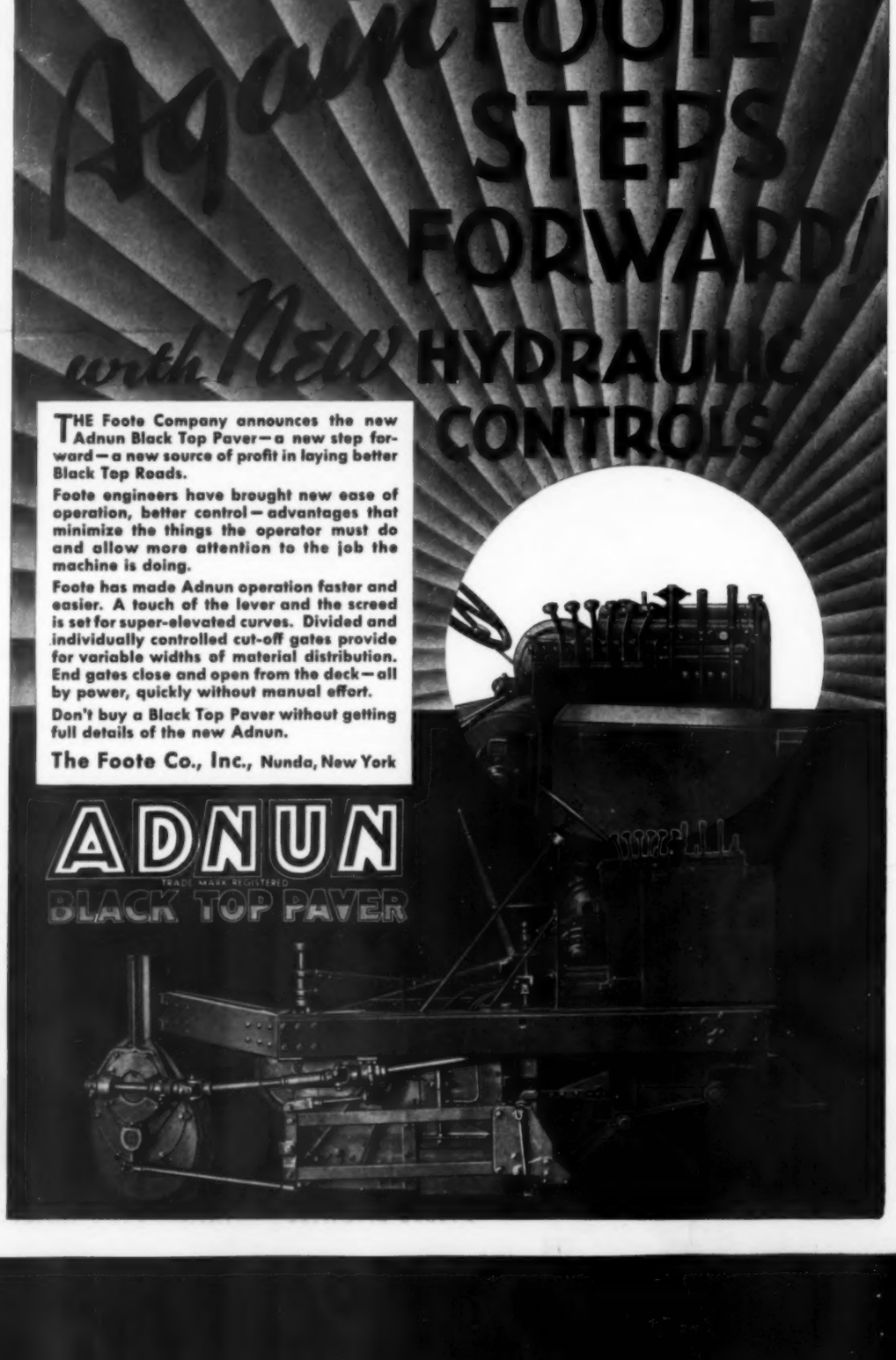
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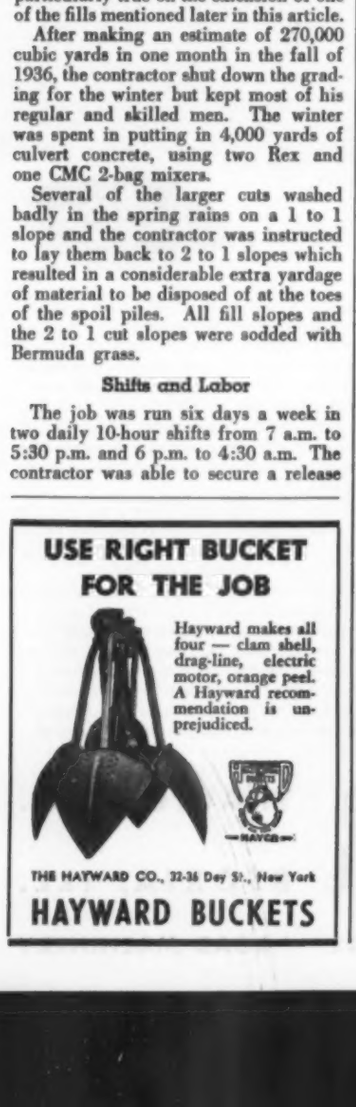
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The Butler Bulk Cement Unloading Plant

A New Portable Plant For Unloading Cement

The problem of unloading bulk cement from railroad cars is one which must be met on many road paving jobs and similar work involving temporary batching plant set-ups. A new type of unloading plant for use with box cars has recently been announced by the Butler Bin Co., Waukesha, Wis.

The plant consists of a bulk cement batcher, a 10-inch inclined screw conveyor driven by an electric motor or gasoline engine mounted on the platform of the plant, and a hopper which is placed at the door of the box car. For the removal of the cement near the door of the car, ordinary shovels are used to throw the cement into the hopper. When it is necessary to move the cement beyond shoveling distance from the door, two-wheeled scoops are used. These scoops pick up the cement and are rolled along to the door where the nose of the scoop projects out the door and the cement is dumped into the hopper. This hopper holds about five or six batches of cement, sufficient to keep the plant operating while an empty car is being moved out of the way and a loaded car brought up to position.

The cement from the box-car door hopper feeds directly into the screw conveyor, which is started by a push button if the power is electric or by throwing in a clutch if a gasoline engine furnishes the power. The cement is thus fed into the batcher and when the batcher scale indicates the required amount of cement, the operator shuts off the conveyor. The batch is then ready for discharge into the batch truck underneath. The time of weighing a batch of 600 to 650 pounds is approximately 20 to 25 seconds, with another 5 to 8 seconds required to discharge the cement, according to the manufacturer. One man is required on the platform of the batcher and two or three men in the box car, depending on circumstances.

A feature of this plant is its portability as it can be transported to the job on a motor truck and erected without the use of a crane. Four or five men can jack it up off the truck and into position. It is only 8 feet wide and the overall height on the truck permits clearing all overhead obstructions.

Welder Assembled For Wide Service

A welding shop down in Miami, Florida, has built its own 200-ampere engine-driven welder which is very unusual from the viewpoint of construction cost, operating characteristics and range of use. The basis of this portable machine is a new 200-amp 1,750-rpm P & H-Hansen Smootharc welding generator, which has been mounted on a home-built frame with pneumatic-tired wire wheels and connected up with an old Ford Model-A motor. The entire mounting, including the motor, cost less than $40.

The welder, Rosselle's, Inc., has included in this device something that doubles the value of the gasoline-driven welder. He has connected across the terminals of the welding generator a permanent set of leads which are carried to a regular outlet box equipped with a standard Edison receptacle mounted on the panel between engine and generator. Into this receptacle he plugs a standard electric drill or grinder connection and has a source of power available when operating this type of tool. The high circuit voltage of the generator is reported to be ideal for operating grinding or drilling tools and enabled the contracting welder to build this portable unit which has already justified its cost from the standpoint of drilling and grinding operations alone.

It has also proved to be a highly adaptable welder with a wide range. The Model-A Ford motor operating at 1,750 rpm handles quarter-inch coated rod on continuous work without any signs of overheating. This development is of interest to contractors who have plenty of use for welding equipment and also for a portable electric generator for operating grinding tools, drills and similar tools.

Concrete Reinforcement

A 32-page booklet on concrete reinforcement and economical methods and materials for placing, supporting, spacing and holding reinforcing in concrete structures, has been published by the Concrete Steel Co., 2 Park Ave., New York City. In addition to the above mentioned information, the booklet contains information on Havemeyer reinforcement as well as notes on specifications and inspection methods.

Copies of this booklet may be secured by interested contractors and engineers direct from the manufacturer.

MALL Vibrator with Gas Engine Power Unit

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Let a MALL Concrete Vibrator tell its own story on your construction job. Ask for a demonstration —you be the judge!

There is a type and size of MALL vibrator—gas engine, air, or electric—for every concrete placing job. Vibration frequencies ranging from 3450 to 10,000 per minute.

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Chalk up another record for the new Rex 160 Pumpcrete! William Peterson, Arkansas contractor, rented this new low-cost pump to place 2500 cubic yards of concrete in this spillway job *at a very satisfactory figure for total placement cost!*

Using crushed creek gravel with 5.2 bags of cement per yard and 2½" slump, he pumped concrete into forms 600 ft. away, at an average rate of 16 cu. yds. per hour for daily yardages up to 125 cu. yds.

Is he sold? You bet he's sold on the idea of using the Rex 160 Pumpcrete for his small jobs. Who wouldn't be sold on a placement method that brings costs down low—that can be used on so many different types of jobs, including underpasses, overpasses, bridges, viaducts, culverts, foundations, etc.—that has been so thoroughly tried and proved by contractors all over the country?

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Send for this new free book Today!

If you are interested in learning how this new, portable Rex Pumpcrete can help you cut placement costs on jobs of less than 5000 yds., use this coupon for your copy of "Presenting the Rex 160 Pumpcrete."

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Please send me my copy of "Presenting the Rex 160 Pumpcrete."

I am interested in buying.....renting.....a Rex 160 (check which).

Name (and title).....

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Unusual Black Top For Ind. County Road

(Continued from page 1)

done on the new surfacing.

Surface Preparation and Prime

With a Caterpillar No. 10 patrol grader for the hard spots and a Gledhill road shaper, the grade was finished 18 feet wide with a 2-inch crown and any slight excess of gravel bladed to the edge of the road. The road was then primed 20 feet wide with 0.25 gallon per square yard of No. 4 flux oil and closed to traffic for four days. This was done for the full length of the job at one time so that it all received treatment under identical conditions and no one along the road was forced to experience any more inconvenience than some neighbor. The road was then ready for the placing of the 18-foot surface on the 20-foot prime which had been applied over the 28-foot graded top between ditches.

The Road-Mix

After the prime had cured, the surplus gravel was rolled back to the middle of the road to be used with the added gravel in the road-mix. Sufficient washed gravel varying from ¾-inch down to No. 10 screen was laid down in the middle of the road to give a flat windrow 4½ feet wide and 7 inches thick. This, when spread to the full 18 feet, gave a 1¾-inch loose layer of gravel. In this gravel all the oversize was crushed and used up to the maximum screen size permitted.

This flattened windrow, which was spread with a home-made spreader box of the right dimensions to give the flat windrow, was then laid out to 16 feet wide with the Gledhill road shaper and shot with 0.6 gallon of SC-4, a flux oil, and thoroughly mixed with two blade outfits until all the stone was coated black. Then it was bladed back to 16 feet wide and 25 per cent of the weight of the oil was added as powdered asphalt, Lincolnite asphalt, using a spreader similar to a lime drill. This was bladed to one side, then to the other and back to the middle of the road with the two blade outfits completely diffusing the asphalt through the oil and aggregate. At times it was necessary to make an extra run up and down the road for the mixing but usually the trips as described were sufficient.

The mixed windrow was flattened to 4 feet wide with the patrol grader and then split into two equal parts with the blade. Each side was laid out separately with the Gledhill road shaper after staking the edges for the guidance of the operator. The material was quite soft at this stage of the process so it was allowed to stand over night to cure. In the morning, with no traffic allowed on the road during the night, from 10 to 12 pounds of buckshot pea gravel

C. & E. M. Photo
A Wayne County, Ind., Road with the Surface Sealed with Fine Sand

per square yard was applied over the surface from the tail-gate of a truck by experienced men who could spread it very uniformly. The surface was then rolled with a 5½-ton Fordson starting from the edges with the rolls lapping over onto the shoulder and the lapping

(Continued on page 24)

Denmark Constructs Viaducts

Work was started this winter in Denmark on the construction of thirty-three viaducts where main highways cross railway tracks, according to a recent report from the U. S. Bureau of Foreign and Domestic Commerce. The viaducts will be erected in the order of the volume of traffic at the various crossings, as shown by the traffic statistics compiled by the State Railways, and the total project will cost about 14,500,000 crowns.

NEW WAYS TO CUT MATERIALS HANDLING COSTS

The flexibility and adaptability of the Porta "Model 347" sectional conveyor offers wide opportunities for cutting costs and increasing profit in the handling of concrete and aggregates.

Made up of independent sections. Can be used on wheel truck, caster mounting or on supports as permanent or semi-permanent conveyor. Easily dissembled, easily transported, easily reassembled. Our catalog describes our complete line of portable, sectional, and permanent conveyors designed to suit every contractor's requirement.

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New Arc Welding Handbook

The fifth edition of the "Procedure Handbook of Arc Welding Design and Practice," containing 1,012 pages and 1,243 photographs and diagrams, has just been issued by the Lincoln Electric Co. The book is designed as a complete arc welding reference guide and, in addition to the major subjects covered in previous editions, contains important new data on the use of arc welding design for machinery and structures.

Copies of this Procedure Handbook may be secured from the Lincoln Electric Co., Cleveland, Ohio. Price: $1.50, postpaid, in the United States; $2.00, in foreign countries.

New Booklet on Trac-Truks

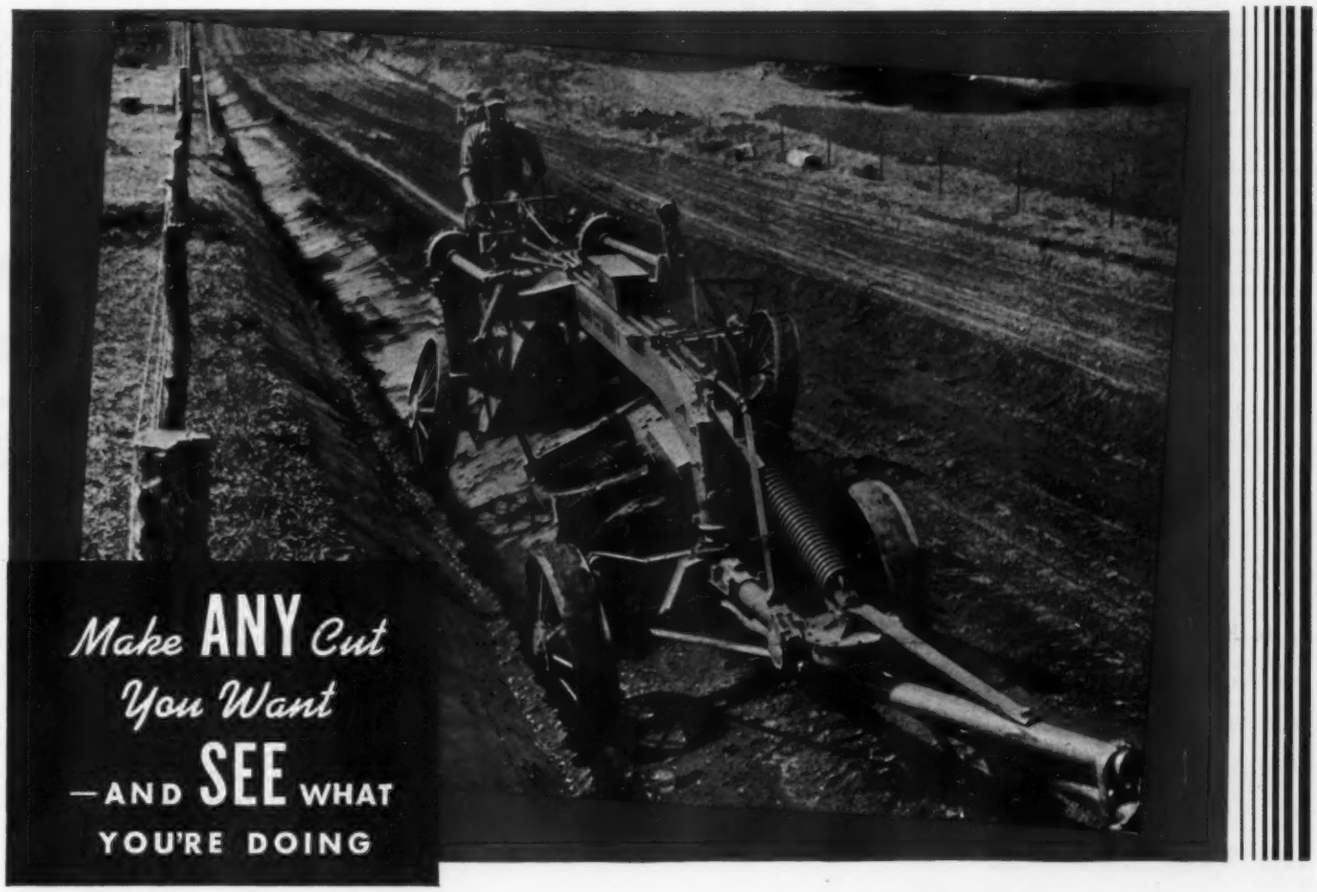
An interesting and well-illustrated booklet on bottom-dump Trac-Truks, covering the principles of their design, construction and operation and their application to various dirt-moving problems, has recently been issued by the Euclid Road Machinery Co., Cleveland, Ohio. These Trac-Truks, which are made in a variety of capacities up to 24 yards, have been used on a number of large dirt-moving jobs throughout the country.

Copies of this spiral-bound booklet may be secured by interested contractors and engineers direct from the manufacturer by mentioning this magazine.

Transvaal, S. A., Plans 500 Miles of Highway

The Transvaal Administration in the Union of South Africa is planning to call for bids on a considerable mileage of surfacing of national roads in that province, according to a recent report from the U. S. Assistant Trade Commissioner in Johannesburg. The first contract will be for 16.2 miles of light bituminous surfacing, including the reconstruction of foundations.

During the next four years, the Province intends to award contracts for 500 miles of light surfacing. Reconstruction and the construction of gravel roads, including the bridge and culvert work, will be done by the Administration although some of the latter may be let on contract.



THE ideal grader, from an operating standpoint, is one on which you can set the blade easily and quickly to make any kind of cut you want and then, having put the blade in that position, can see what you are doing. That's exactly what you get in Adams New-Type Leaning Wheel Graders to a degree not equalled in any other machines. Owners will tell you that Adams wide range of adjustments and blade visibility mean real money on the job in better work and much time saved. Owners will tell you also that Adams Graders are easier to operate—strong—rigid—and stand a lot of punishment with very little upkeep.

Available in 12, 10, and 8-ft. sizes—power and hand controlled. Let your local Adams representative give you complete information, or address J. D. Adams Company, Indianapolis, Ind.

* * *

NOTE: The Adams line includes smaller leaning wheel graders also, and a complete line of motor graders, elevating graders, hauling scrapers, etc. Catalogs on request.

BE UP TO DATE IN '38 WITH ADAMS

ADAMS
Leaning Wheel
GRADERS

LEFT: From ditching position to high bank-cutting position in 40 seconds with power-controlled machines. Wide range adjustability with speedy operation.

RIGHT: Showing clear path of vision between operator and blade in sharp ditching position.

New Concrete Placing Unit Truck Mounted

The Crete-Mobile, recently announced by the Hercules Steel Products Co., Galion, Ohio, is a complete unit for mixing concrete and placing it pneumatically, installed on a standard 1½-ton truck. The equipment consists of a 105-cubic foot two-stage air compressor driven directly from the truck motor by a Hercules split-shaft power take-off.

The compressor is mounted directly at the rear of the cab, a water tank is suspended immediately to the rear of the compressor and a mixing tank and cement motor is placed at the rear of the truck chassis. An air hose extends from the air receiver tank to the air motor, which forces the sand and cement through the hose, at the end of which is a nozzle attachment. At this nozzle water under approximately 40-pounds pressure is allowed to enter. The water hydrates the cement and sand. The mixture, which has been hydrated, is then shot from the nozzle to the point desired.

Concrete 1½ inches thick, covering 10 square feet can be placed per hour with this machine, according to the manufacturer. It is particularly designed for use by contractors, state and county highway engineers and maintenance men.

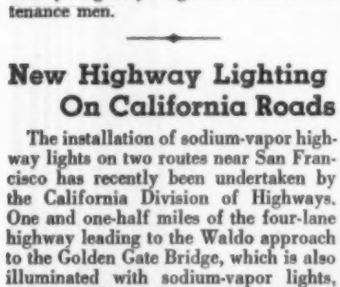
New Highway Lighting On California Roads

The installation of sodium-vapor highway lights on two routes near San Francisco has recently been undertaken by the California Division of Highways. One and one-half miles of the four-lane highway leading to the Waldo approach to the Golden Gate Bridge, which is also illuminated with sodium-vapor lights, will be included in one section while 3½ miles of the Bay Shore Highway, between the San Francisco County line and the City limits of South San Francisco, will be lighted by new sodium-vapor units. This installation will be experimental in nature, with the luminaires and lamps of various designs and sizes and the units spaced at varying intervals for test purposes.

Both of the highways to be lighted carry heavy night traffic and are subject to periods of thick fog blown in from the Pacific Ocean. Accident records are available for a considerable period over both routes, and will be compared with records after lighting has been in operation long enough to determine its effect on the accident rate.

Sodium lighting will be in operation soon on another approach to the Golden Gate Bridge, the Sausalito lateral. This approach will be illuminated by thirty-four units similar to those used on the Golden Gate Bridge.

Kinney Distributors Feature Spray Control by Air from the Cab!



Kinney Spray Control in Cab

EXTRA PROFIT is made possible, through lower operating costs, by the new air operated controls which Kinney have put into the cab this season. Another lower operating cost feature is the 1000 pound weight reduction (on the 1000 gallon size) resulting from the use of alloy steel tanks.

KINNEY FEATURES RETAINED are quick starting, ample pump capacity, efficient heating unit low in the tank, fuel tank well away from burners, ladders, hand rails, relief valves and vents, inside closing valve, etc.

BULLETIN A-1938 with complete details will be sent by Kinney Manufacturing Co., 3531 Washington Street, Boston, Mass.

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Rational Regulations For Roadside Planting

North Carolina Requires Permits for Planting in Order to Insure Road Safety, Utility and Beauty

✦ IN ORDER that all roadside improvement work in North Carolina may be made uniform and completely effective from the standpoints of highway safety, utility and beauty, the State Highway and Public Works Commission has drawn up a set of regulations for roadside planting. Section 3846 (u) of the Consolidated Statutes states that no tree or shrub in or on any state road or highway shall be planted, trimmed, or removed without a written permit from the Commission, and then only in accordance with the regulations of the Commission. These regulations follow:

1. *Application for Permit.* Application for the permit referred to above must be made in writing, and sent to the main office of the Commission or to the office of a Division Engineer. An investigation of the proposed work will be made by the Commission's representatives and the permit issued if satisfactory compliance with the regulations is evident.

2. *Distance of Planting from Pavement.* Plants must be placed not less than 25 feet from the center line of a pavement 30 feet or less in width; nor less than 10 feet from the edge of a pavement 40 feet or more in width. An exception to this regulation is the case of planting shrub and vine ground cover plants on high steep slopes in rugged and mountainous regions.

3. *Distance of Planting from Highway and Railroad Grade Crossings.* No plants other than vine ground cover or dwarf shrubs not over 2½ feet in ultimate height shall be placed within 100 feet of a highway or railroad grade crossing. No high shrubs, low-growing trees, or trees with low dense foliage shall be placed within 1,000 feet of either a highway or railroad grade crossing. Deciduous trees with lower branches removed to a height of 8 feet above pavement elevation may be placed in limited quantities within the area between 100 and 1,000 feet from such grade crossings if arranged in a manner that will not restrict clear vision.

4. *Planting on Inside of Curves.* No plants shall be placed on the inside of curves in any manner that will restrict clear sight distance to less than 1,000 feet, measured on the center line of the highway. Deciduous trees with lower branches removed to a height of 8 feet above pavement elevation may be placed in limited quantities on the inside curves if arranged in a manner that will not restrict clear vision.

Protecting Future Development

5. *Protection to Drainage and Future Development of the Highway.* No plants shall be placed at locations where they will be detrimental to drainage ditches or structures. No plants shall be placed close to the top edges of steep cut slopes (of moderate height) which should be flattened before planting is done. No plants shall be placed in locations where they will damage, or be damaged by, a planned or possible future development and expansion of the highway.

6. *Planting in Relation to Pole Lines.* No tall growing trees or shrubs shall be placed directly beneath pole-line wires. Trees which will ultimately attain a height equal to the height of pole-line wires shall be placed not less than 15 feet from poles on which wires are carried on cross arms, and not less than 10 feet from poles on which wires are carried without cross arms. Distances greater than these minimums should be used where possible.

7. *Formal Rows of Plants.* Placing of plants in straight, evenly spaced rows shall be limited to town approaches, bridge approaches, locations near cross roads, in suburban areas, or immediately adjacent to farm homes. In no case shall formal rows be used through woodland or brushy cut-over land, nor shall they be used along highways having frequent curves, steep grades, or deep cuts. Trees should be uniform in the row, at distances of not less than 50 feet or more than 100 feet. Spaces shall be left in formal rows at places where a tree location falls under a large existing tree or near a building, driveway, or stream.

8. *Choice of Plants.* Along rural sections of highway, only native species of plants shall be used, although such plants may be either nursery-grown or collected stock. Introduced species and horticultural varieties of plants shall be confined to suburban areas of towns, triangles at intersections, and immediately adjacent to homes, factories, filling stations, or other places of business and habitation, where they will give interesting variety and color to roadside planting without breaking up the natural and characteristic appearance of the surrounding landscape. Trees recommended for formal row planting are the

(*Continued on page 25*)

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Manufactured in 2, 5 and 15-Ton Sizes.
For capacity comparison, ½" cable used:
2-Ton "Lightweight" ..... 75 ft.
5-Ton "General Utility" ..... 250 ft.
15-Ton Triple-Geared "Special" ..... 1200 ft.
Patent instant gear change and positive internal brake that never fails, and will lock load.

Gear Ratios	Weight	Price
2-Ton 4 & 22 to 1	60 lb.	$50
5-Ton 4 & 24 to 1	110 lb.	$75
15-Ton 4, 19 & 109 to 1	630 lb.	$200

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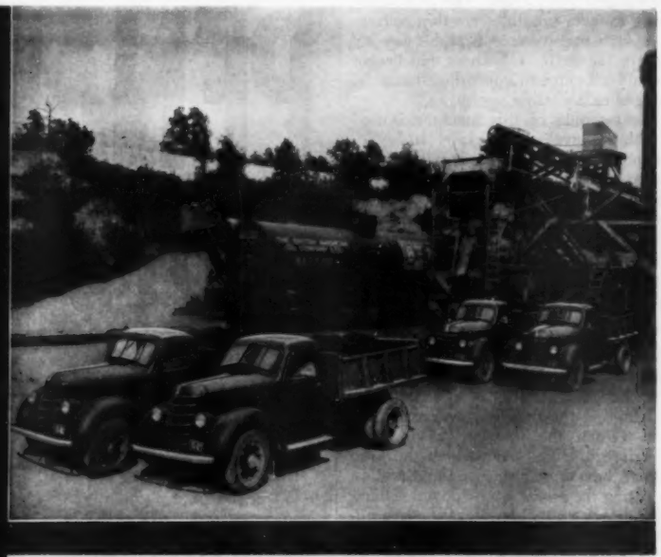

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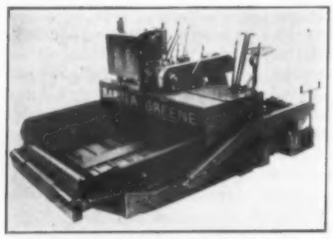

The New Tamping-Leveling Finisher

Bituminous Finisher Tamps and Levels Road

The new Tamping-Leveling Finisher for bituminous road construction, recently announced by the Barber-Greene Co., 485 W. Park Ave., Aurora, Ill., automatically levels without forms, can lay to grade, levels and compacts simultaneously, and gives a permanent uniform density which reduces and simplifies rolling, according to the manufacturer. The machine normally lays a 10-foot width but cut-off plates can quickly be attached for an 8-foot width or extensions added for 12 feet. The unit is designed to make possible very thin courses for resurfacing pavements and it can lay flush to the curb. Thickness and crown are under complete control and can be changed easily while operating.

The tamping of this machine is tied in with the leveling principle. In laying a smooth surface over an irregular subgrade, the finisher necessarily lays a mat of varying thickness. Since it levels and compacts at the same time, the machine automatically feeds the correct amount of material for the level compacted thickness, filling in depressions with extra material and compacting it to level.

The leveling principle is based on a delayed response of the screed to the crawlers' up-and-down movement over base irregularities, at the same time maintaining the required average thickness. When the crawlers respond to base irregularities over which they are riding, they simply change the direction by tilting the screed up or down. Thickness, crown and super-elevation are adjusted while the machine is in operation, these adjustments being tied in with the leveling principle in such a way that alterations are slowly reflected in the finished surface.

The machine is easily portable. Upon completion of a strip, the operator lifts the entire unit by the easily operated hydraulic hoist, throws the transmission into travel speed and the machine moves along under power at high, forward or reverse travel speeds. When the machine is once more in correct position, the unit is lowered and ready to run. For extremely lumpy unworkable material, an agitator, consisting of a toothed shaft rotating directly in front of the tamper bar, may be added. For extremely tacky material, the screed may be heated.

New Gasoline Engines

A new series of gasoline engines, known as the M series and including three models, M6271, M6290 and M6330, was recently announced by the Continental Motors Corp., Muskegon, Mich. Model M6271 has a 3⅝-inch bore x 4⅜-inch stroke, Model M6290 a 3¾ x 4⅜-inch bore and stroke, and Model M6330 a 4 x 4⅜-inch bore and stroke.

The cylinder and crankcase of these new engines are cast integral of chrome nickel iron. The crankcase has unusually rugged construction with seven main bearings. Tappets are of the barrel type, 1⅛-inch in diameter, full-pressure lubricated, and operate in replaceable interchangeable sleeve-type guides. Oil galleries are drilled in the cylinder block and no tubing is necessary to conduct the oil to the bearing surfaces. The crankshaft is of seven-bearing fully counterweighted construction. Piston pins are full floating, having a bronze bushing in the small end of the connecting rod.

Lubrication is by a gear-type pump supplying full pressure to all main, rod, and camshaft bearings and tappets. The cooling system includes a centrifugal-type ball-bearing water pump mounted on the front end of the cylinder block and discharging into a distributing tube located over the valves. Water jackets are of the full-length type and cooling of the bottom portion of the jacket is caused by the natural thermo-circulation of the water itself. Manifolds are of the individually ported type, delivering uniform fuel mixture to each cylinder.

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New, efficient small transient concrete mixer . . made entirely of steel . . equipped with pneumatic rubber wheel. Batch of approximately 3 cu. ft. thoroughly mixed while operator is walking a distance of 40 to 50 feet. Eliminates mixing small batches by hand or using large mixer. Just load up—and haul to the form—dump, and on to the next barrowful.

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So what? So be sure your trucks will see you through on time, that's what. Some don't, you know, when the going gets pretty rough. Then there's the devil to pay (otherwise known as the "party of the first part").

But you can count on Walter Tractor Trucks. Good roads, bad roads or no roads at all — somehow the Walter gets through. Of course, it's **four point positive drive** that makes the Walter like that.

Found **only** in the Walter, because of its patented automatic lock differential, it insures power on all four wheels. If one wheel loses traction and spins, its mate does not stop like a tired horse whose mate has fallen in the mud, but continues to turn under full power.

Don't lose your shirt on a penalty contract. Insure yourself with Walter Tractor Trucks.

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Five Safety Projects On Nevada Highways

Sodium-Vapor Lighting and Grade Separations Combined To Make Intersections Safer In Reno and Las Vegas

By ROBERT A. ALLEN, State Highway Engineer, Nevada Department of Highways

(*Photos on page 48*)

✦ DURING the past two years the Department of Highways of the State of Nevada has provided lighting facilities for five major highway structures located in the cities of Reno and Las Vegas.

First Installation

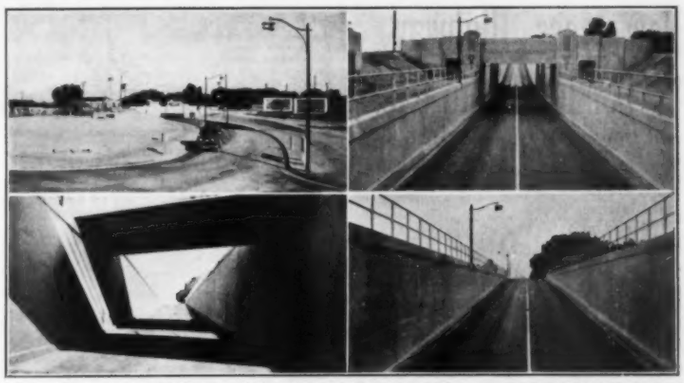
The first experiment in sodium-vapor lighting in the State was made on two new important underpass highway-railway grade separation structures completed in December, 1936. Both underpasses are located in the City of Reno and constitute long-needed improvements to provide for traffic safety at those points.

The West Second Street Underpass (C. & E. M., May, 1937, pg. 7) replaced a dangerous antiquated structure and provides a safe tangential approach from West Second Street in Reno to U.S. Route 40. An interesting feature of this underpass is the large skew of its design. The structure being quite short, it was decided to install two G-E sodium-vapor 10,000-lumen units mounted on Union Metal standards to illuminate the underpass structure itself. A unit was therefore placed at a suitable distance in front of each of the portals. A third unit was installed at the intersection of West Second Street with U.S. Route 40, thereby eliminating a safety hazard. The pedestrian tunnels through the underpass are illuminated with flush ceiling-type incandescent units.

The Wells-Alameda Street underpass and bridge in the east section of Reno (C. & E. M., Nov., 1936, pg. 2) is a major structure involving a long connecting ramp which leads to the north portal of an underpass structure under the main-line tracks of the Southern Pacific Railroad. A shorter ramp from the south portal leads to a large continuous-girder concrete and steel bridge across the Truckee River and thence to a connection with Wells Avenue. The combined underpass and bridge replaced a dangerous grade crossing and narrow bridge at which several fatalities occurred.

The total length of the project including ramps is approximately 1,000 feet. Hence it was necessary to install seven G-E sodium-vapor luminaires on metal standards. These were staggered at appropriate intervals to secure a good level of luminosity to and through the underpass. One unit was placed at the intersection of Alameda Avenue and U.S. Route 40 further to increase visibility.

An interesting feature of this installation was the placement of floodlights in the stepped bases of the pylons on each side of the south portal of the underpass. The effect of the floodlights is to accentuate the architectural features of the portal.

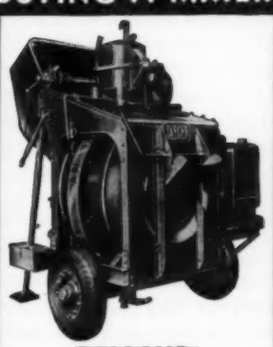


Four Views of an Underpass in Las Vegas, Nev., the Approaches to Which Are Lighted by Sodium Vapor Units

In all underpass lighting installations a Telechron-motor-actuated automatic time switch with astronomic dial is used to open and close all of the lighting circuits.

(*Continued on page 30*)

BUYING A MIXER?



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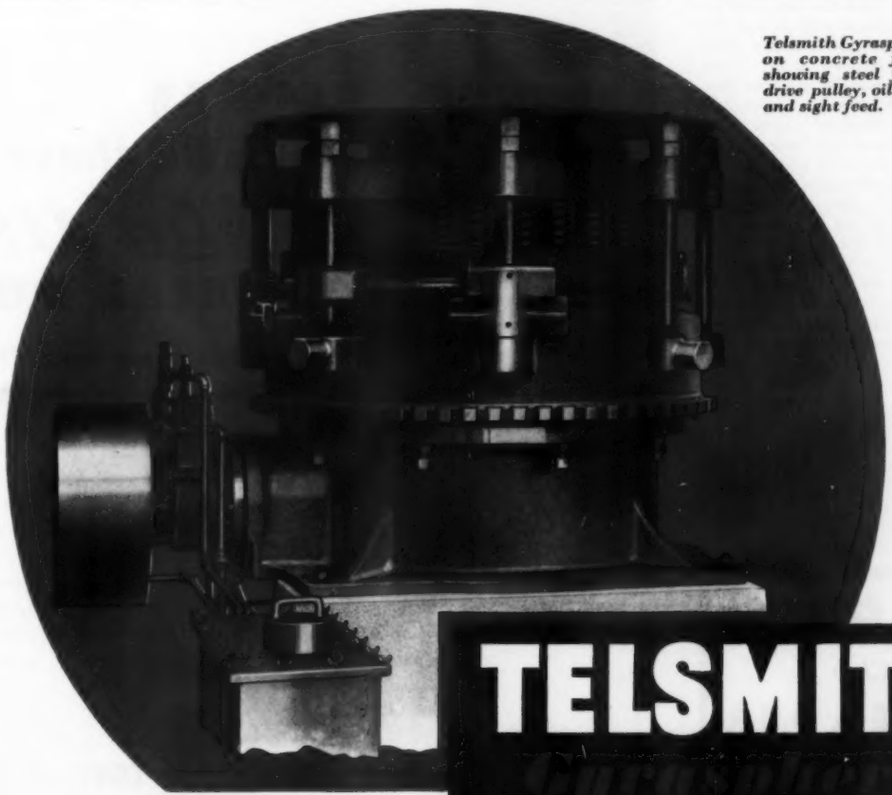

Telsmith Gyrasphere Crusher on concrete foundation, showing steel feed hopper, drive pulley, oil tank, piping and sight feed.

TELSMITH GYRASPHERE CRUSHERS

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MORE CUBICAL PRODUCT . .
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with less trouble . . . less power . . . less upkeep

Here's a secondary crusher that knows its job—and has what it takes to do it.

It's as simple as that. All *you* have to do *for* the Telsmith-Gyrasphere is to set it for the size you want—ranging from ⅜" to 1½" with standard concave; or ⅛" to ⅜" with special concave.

Then bring on your rock—and let your conscience be your guide—excess feed means nothing to this baby. The Gyrasphere *can* . . . and does take it! Yes, sir—an unlimited, unregulated choke feed. *That means tonnage!*

When it comes to crushing, the Gyrasphere doesn't "crack down" on the rock. It *thrusts up.* The spherical head and its corresponding concave are like an *inverted* mortar and pestle. Rock is caught between two multi-curved surfaces—and *cubed.* That means an improved product with fewer oversize slabs and splinters.

We could write a book about the Gyrasphere. We have, but it's brief, interesting and gives all the facts. Mailed without cost or obligation. *Ask for Bulletin Y-34.* YC-12

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New Mass. Highway Connects with U.S. 1

(*Continued from page* 11)

1935-36 when so many states suffered costly damage from the frequent freezing and thawing.

Two 6-inch layers of pit-run gravel rolled separately were placed before the construction of the pavement began. The top course was graded with the Austin-Western 77, the curb set on either side and then center stakes set the length of the work at 50-foot intervals for the final grading and for the placing of the bottom stone. The gravel was given a 1-inch crown to prevent a dished base after the various trucking operations had been completed.

The bottom stone, 2¼-inch maximum down to ¾-inch, was purchased from a local producer, the Lynn Sand & Stone Co., and was delivered by a subcontractor and spread by dumping from the tail-board into the front of an Adnun Finish-Spreader. Two men attached the spreader to the trucks. It spread the stone 10 feet wide and 5 inches thick for a 4-inch compacted layer. After rolling to compaction by a 14-ton Buffalo-Springfield machine, the interstices of the crushed traprock course were filled with sand hand-cast from a truck. A drag broom 6 feet wide and made up of a group of fiber brooms was pulled over the surface to distribute the sand and permit it to dry out completely and thus more readily drop into the interstices of the stone. No rolling is done during this process of "binding" the bottom stone with the sand as that might cause arching of damp sand in the upper portion of the layer and prevent the sand reaching the bottom of the course. When the course has absorbed all the sand possible it is rolled and the brooming continued. At the end of the rolling the excess sand was hand-broomed into piles and removed from the road by five men.

Surface Stone and Penetration

The surface stone, having a maximum size of 2½ inches and with not more than 5 per cent of ¾-inch stone, was spread in the same manner as the bottom stone to give a compacted layer 2½ inches thick. It was spread for a ½-inch crown, carried across the full 10-foot center of the roadway, to prevent a dished surface at the center. When this was rolled it approached the specified crown of ¼ inch per foot of width. This project had no crown in the completed section, the roadway sloping uniformly from the inside curb of the roadway to the outer curb and gutter.

When rolling of the surface stone with the 12-ton roller was completed, the Penolithic oil, a patented product, was sprayed over the surface at the rate of 0.1 to 0.125 gallon per square yard by the patentees, Warren Bros. Co. This was allowed to set for at least one-half hour and was applied not more than one day ahead of actual penetration with the asphalt. This setting period permitted the oil to reach some depth into the layer of stone.

(*Continued on next page*)

MAJOR QUANTITIES

Item	Quantity	Unit Price
Roadway earth excavation	46,600 cubic yards	$ .30
Bridge excavation	2,930 cubic yards	3.00
Ledge excavation	39,000 cubic yards	2.50
Ordinary borrow	354,600 cubic yards	.45
Class C concrete (1:2:4)	2,160 cubic yards	14.00
Stone, roadway base	22,220 tons	1.35
Drainage pipe, concrete, 8 to 18-inch	10,500 feet	.50 to 2.00
R.C. drainage pipe, 12 to 60-inch	5,600 feet	1.15 to 14.00
Cast iron pipe, 10 to 36-inch	1,500 feet	1.50 to 14.00
Vit. clay pipe, side drain, 6-inch	3,500 feet	1.00
Concrete pipe, side drain, 10-inch	2,700 feet	1.25
Catch basins	176 catch basins	65.00
Curb inlets	134 curb inlets	12.00
Gravel borrow	96,700 cubic yards	.50
Sand borrow	3,500 cubic yards	1.50
Concrete, reinf. (1:2:3½)	2,195 cubic yards	18.00
Cement stone masonry, on 519 piles.	673 cubic yards	8.00
Timber piles	16,514 feet	.50
Straight granite curb	35,875 feet	.90
Manholes	50 manholes	65.00
Fine grading	260,000 square yards	.08
Reinforcing steel	460,000 pounds	.035
Bituminous waterproofing	1,910 square yards	.25
Trench excavation	15,500 cubic yards	1.20
Clearing and grubbing	11 acres	100.00
Channel excavation	4,920 cubic yards	1.00
Loam borrow	17,600 cubic yards	.50
Peat excavation	42,700 cubic yards	.30
Granite slope edge curb	20,100 feet	.65
Seeding	62,700 square yards	.04
Cable guard rail, 6-strand multiple	15,000 feet	.85
Road oil, 45 per cent (used to lay dust)	2,000 gallons	.10
Bituminous concrete for sidewalk	840 tons	6.75
Bituminous concrete for bridge	220 tons	6.50
Steel sheeting	103,761 pounds	.05
Membrane waterproofing	509 square yards	1.00
Gunite	4,600 square feet	.50
Structural steel	239,513 pounds	.04
Creosoted piles	30,287 feet	.80
Oiled stone for roadway	19,490 tons	2.40
Oiled stone for sidewalk base	1,490 tons	2.20
Asphalt for roadways	256,200 gallons	.085
Asphalt for sidewalks	15,300 gallons	.085
Contractor's bid on which contract was awarded		$825,179.15

BURCH
Chip
SPREADER

for
SMOOTH
STRAIGHT
SPREAD
—any depth
—any material

Width and pounds per square yards controlled by independent motor. Strongly built to take abuse—trouble free. Use with any size, rear end, dump truck.

WRITE FOR LITERATURE

THE BURCH CORPORATION
CRESTLINE, OHIO

CHECK *these advantages of*
Franklin AIRCOOLED
INDUSTRIAL POWER UNITS

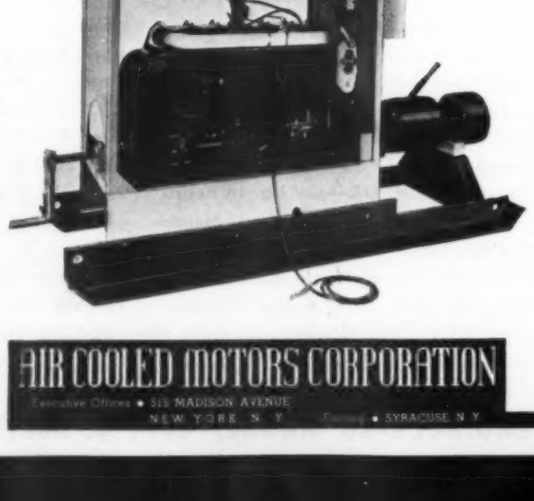
against your present power costs. They give you *some* reasons for the construction industry's rapidly growing appreciation of the inherent economy of air cooled engines for industrial use.

LOW OPERATING COST

Greater *positive* fuel economy is assured because of the air cooled engine's highly efficient cooling system which enables it to quickly develop more efficient and constant operating temperatures. Accurate field records show gasoline savings up to 30% over water-cooled types of power.

LOW MAINTENANCE COST

In an air cooled engine, the expense of maintaining radiator, water pump, hose, fan belt and other plumbing fixtures is entirely eliminated. An air cooled engine is easily serviced by any good mechanic familiar with ordinary water cooled engine practice. Its extremely simple construction and easy-access design makes for economical maintenance. For example, its individual cylinder construction alone effects radical savings in time, labor and expense.



● An air cooled engine is an all-weather engine because it will not freeze in zero weather, boil or overheat in extreme heat or high altitudes, —and *requires no anti-freeze*. Frozen and cracked engine blocks are a thing of the past, —constant draining and refilling is no longer required,—nor is it necessary to locate your unit close to a water supply.

● An air cooled engine weighs less because it has no radiator, plumbing system or water. The use of aluminum alloy in cylinder heads and other mechanical parts adds to its lighter weight without any sacrifice of ruggedness. In trucks, especially, this saving in weight is important because it allows for greater pay load.

If your problem is one of power for road machinery, trucks, industrial equipment, agricultural machinery, saw mills, compressors, pumps or other industrial use,— *write for Bulletin No. 9E* and learn how you can cut *your* power costs.

AIR COOLED MOTORS CORPORATION
Executive Offices • 515 MADISON AVENUE
NEW YORK, N. Y. Factory • SYRACUSE, N. Y.

Two 30-Foot Lanes Safe for Traffic

(*Continued from preceding page*)

The asphalt penetration was applied at 325 degrees F. and at the rate of 1.4 gallons per square yard with a Kinney 2,000-gallon distributor having a 15-foot spray bar. The 50-60 penetration asphalt was furnished by the Colonial Beacon Oil Co. and applied by Tri-Mount Bituminous Products Co. of Boston. Twelve-ton rollers with the rolls wet with kerosene immediately ironed out the surface until it was smooth. Then ½ to ⅝-inch chips treated with Penolithic oil at the producer's plant were applied with a self-powered Burch spreader attached to the back of a truck which backed over the penetrated strip. The keystone and cover chips totaled about 0.025 ton per square yard of which about 60 per cent was a first application as keystone. This was broomed with a gang broom 6 feet wide and 10 feet long with straight brooms across the unit front and back and three diagonal brooms alternating in direction across the frame. The brooms on this drag were all of steel, and the drag was pulled by a truck. The keystone chips were spread in two layers, the first being a very light one which was immediately broomed and rolled, followed by a second which was also broomed and rolled. These two were aimed to fill the surface voids in the top stone but still permit the coarse aggregate to show. The keystone was rolled with the 12-ton rollers with one-half laps for the final riding surface.

The road surface was sealed with 0.4 gallon of the same asphalt per square yard and the cover stone applied with the chip spreader. It was broomed for texture to give the surface a uniform appearance, leaving a slight excess of the chips which were whipped off by the traffic in the first few days of travel. The road was opened to traffic within 24 hours of the completion of rolling provided that other work had been done.

On this contract there were an unusual number of catch basins, curb inlets and manholes in the roadway surface. The manholes were set as closely to grade as possible and then used as the controlling grade for the surface of the roadway. On the other hand, the cast-iron gratings of the catch basins in the gutters were set 1½ inches below the grade of the roadway surface so that there would be positive drainage to them when traffic had pounded the surface to maximum compaction.

Sidewalks

As this project traverses a thickly populated section, sidewalks were provided for the entire length of the contract. A 10-foot sidewalk area including the sidewalk proper and a 5-foot grass plot was provided on the outside of the roadway. The sidewalks were surfaced with a 2-inch Penolithic base and a 1-inch hot-mix surface rolled with a 5-ton roller. Preparation of the sidewalk section was done with a tractor and bulldozer which gave good compaction of the subgrade.

Personnel

This project, FAP 261, was started on October 22, 1936, by C. J. Maney Co., Inc., of Boston, Mass., with Michael Taurasi as Superintendent. The contract called for the completion of the work by the end of October, 1937, and the contractor fulfilled the contract within the specified time. The total length of the work was 2.7 miles. For the Massachusetts Division of Highways the work was under the immediate charge of Lewis Fritz and H. Gordon Gray as Resident Engineers.

Full-Revolving Crane With Derrick Capacity

A broad-gage full-revolving all-steel live-boom traveler, combining the stability and capacity of a derrick with the mobility of a locomotive crane and capable of excavating or material handling with clamshell, dragline, hook or sling, has been developed in the American Revolver by the American Hoist & Derrick Co., St. Paul, Minn. This machine is a compact unit requiring no guys and is available with wheel, skid or gantry whirlers.

The Model 465 American Revolver has a capacity of 6,800 pounds at a 60-foot radius or 20,000 pounds at a 20-foot radius. The boom is 65 feet long measured from center to center of pins and has a 10-foot removable section. The machinery deck is 10 feet wide and 23 feet 6 inches long. The length over the operator's stand is 25 feet 2½ inches. It may be mounted on track wheels or pier, barge, skid, tower or gantry and is powered as desired with steam, electricity, gas-electric or diesel-electric drive. The shipping weight for the steam-power unit is approximately 74,000 pounds and its working weight complete is 82,577 pounds.

The Model 465 American Revolver can be shipped assembled complete on one flat car. All that is necessary to prepare it for shipment is to remove the boom, mast and back legs, pin connections making it easy to remove these members. The revolving deck is arranged to permit the boiler to be shipped mounted. The Model 685 American Revolver will handle 12,000 pounds at 80 feet and has an 85-foot boom. Model 1085 handles 16,500 pounds at 90 feet radius and has a 100-foot boom. Model 10125 handles 100,000 pounds at 40 feet radius. The boom is 125 feet long.

Catalog No. R-1 of 32 pages, describing the various models of the American Revolver as well as containing general specifications, may be secured direct from American Hoist & Derrick Co., St. Paul, Minn., without obligation by mentioning CONTRACTORS AND ENGINEERS MONTHLY.

WILLIAMS
FORM CLAMPS

It costs 8c per cu. yd. of concrete for rod replacement in using Williams Clamps on a form design of 800 lbs. pressure per sq. ft.

Compare this with the cost of your present ties—and you will be added to our list of satisfied Customers.

Order today—24 hr. service—send plans for rod layout.

Williams Form Engineering Corp.
1244 Prospect Ave., S. E.
Grand Rapids Michigan

NEW ETNYRE SPRAY-BAR INVENTION!

Sets New Standard in Applying Asphalt, Road-Oil and Tar in Bituminous Road Construction

• • •

Annoying Problem of "Dripping and Slobbering" of old-style Spray-Bars Eliminated by New Etnyre Full Length Circulating Spray-Bar (24 feet or wider) with Instant Valve Shut-Off at Nozzles, Triple-Lap Spray Gives Even, Uniform Application.

Etnyre, Model "FC," 1000 gallons with 5th wheel Tachometer and Spray-Bar in operating position. Other sizes 600 to 2000 gallons. Spray-Bar, sectional, "folds" for transit.

NO DRIPS! NO SKIPS! NO LEAKS! NO STREAKS!

Now, for the FIRST time in ALL distributors, the heaviest or lightest of Asphalt, Road-Oil or Tar is circulated the FULL LENGTH of spray-bar . . . 24 feet or wider . . . No more "frozen" ends to thaw out . . . no congealed fluid in any part of bar . . . no clogged nozzles. Start instantly and stop with a clean-cut finishing line with NO DRIPS! NO SKIPS! NO LEAKS! NO STREAKS! Fluid is fed to bar through 2 lines, instead of one, and is carried through a "steel inner-tube" to supply nozzles near ends to insure uniform application. Unlike other so-called circulating bars, there is no mechanism inside the Etnyre bar to obstruct free-flow and complete draining. Bar is easily extended, by sections with leak-proof unions. Can spray strip of any width at any point along bar without "plugging" nozzles; simply disengage valve-lever at nozzle for instant shutoff, without dripping. Bar is cleaned and drained by VACU-FLO, which employs the high vacuum made possible by the powerful, self-metering Etnyre pump. A "TRIPLE-LAP" spray delivers even, accurate application from 1/10th to 3 gallons per square yard. Be sure to get complete information about this new Etnyre Invention and other features in the Etnyre "BlackTopper". See your Etnyre Dealer or mail handy coupon below.

Get Our Attractive NEW PRICES Now

The New

ETNYRE *BlackTopper*

DISTRIBUTORS

E. D. ETNYRE & CO.,
Oregon, Ill., U. S. A.

Please send literature and price on Etnyre "BlackTopper" of ..... gallon size.

Name

Company or Highway Dept.

City State

Wayne County Uses Powdered Asphalt

(*Continued from page* 16)

continued on each trip. The road was closed for three to four days for completion of the curing and then opened to traffic. It is difficult to impress the citizen of the importance of this period of curing of the road and the over-enthusiastic farmer is liable to think that he can drive on the road at any time "Because it's finished isn't it?" It is this all-important period of setting up that determines the future service of the road and if only the people living along the road could be impressed with the importance of keeping heavy farm horses, wagons and, above all, tractors with lugs off the surface they would be rewarded a thousand times over for their patience.

After the road had been open for a few days and the surplus gravel had been swept to the edges by the traffic, the surface was shot with 0.2 gallon of asphalt emulsion and sufficient torpedo sand to fill the voids hand-cast over the surface. Mr. Coffin has found in his experience that the use of the emulsion for the seal overcomes the possibility of bleeding.

The same results in sealing the surface have been secured in Wayne County by using the powdered asphalt for the seal. The powdered asphalt is applied by the lime drill at the rate of 5 per cent of the weight of the oil in the original mix, then dragged with a steel broom drag, finally shot with 0.1 gallon per yard of flux oil and sanded with the mixed torpedo sand.

Experimental Section

On the Centerville job described an experiment was tried. On ½ mile at the south end of the job, the surface was sealed four days after the road-mix had been laid out, during which time no traffic had been permitted to use the road. The results were not as satisfactory as when the traffic had been allowed the use of the road for a moderate period between the placing of the road-mix and the seal.

There is a service rendered by traffic in compacting the road surface that cannot be secured as cheaply in any other manner. The repeated rolling with a flat roller does not secure the kneading effect of the rubber-tired vehicles and the only way to get this annealing of the surface is with rubber tires, either on the automobiles of the people living along the road and using it for their own travel or by rolling with the commercial rollers, now available, equipped with some nine large pneumatic tires and capable of being loaded to furnish any desired weight per inch of tire width.

Subgrade Felt for Use In Concrete Pavements

Carey Elastite subgrade felt, made by the Philip Carey Co., Lockland, Cincinnati, Ohio, is a light, tough, strong yet inexpensive waterproof paper of felt which, when laid under concrete pavements, prevents absorption of water from the fresh concrete into the grade, makes a complete separation between the slab and subgrade, and eliminates the necessity of sprinkling the subgrade.

This subgrade felt which is saturated with asphalt comes in rolls of convenient size for easy handling, each containing 1,000 square feet in 38 or 46½-inch widths. In laying the felt, the widths are lapped 4 inches over the edge of the adjoining strip.

Complete information on the features of this subgrade felt and its use is contained in Form No. 2054-A which may be secured from the manufacturer.

The New Smith-Mobile

Smith Announces New Type of Truck-Mixer

The Smith-Mobile, a new type of truck-mixer and agitator just announced by the T. L. Smith Co., 2857 N. 32nd St., Milwaukee, Wis., has an entirely new principle of operation, according to the manufacturer.

The unique duo-cone mixing drum is equipped with a combination charging chute and sealing door. There is no hatch to open or close. The drum rotates during the charging operation and mixing starts the instant the materials enter the drum, resulting in a greater capacity for a given drum volume. Big T-shaped spiral blades produce a positive end-to-end movement of the aggregates. Water is pumped into the drum at 50 pounds pressure and is introduced through the feed opening, instead of through the support bearing at the opposite end. A special nozzle, located in the top section of the drum, is used to secure a spray effect, resulting in a faster and more uniform distribution of water in the batch.

Other features of the Smith-Mobile are high discharge without a hoist, a distributing spout carried on a pivot bracket, load carried in front of the rear axle, an accurately calibrated two-compartment water tank, elimination of water bells in the drum, and a direct-driven rotary turbine pump included as standard equipment.

The Smith-Mobile, which is available in 1½, 2, 3 and 4-cubic yard truck-mixer sizes with corresponding 2, 3, 4½ and 6-cubic yard agitator sizes, is described in more detail in Bulletin No. 184, copies of which may be secured direct from the manufacturer.

Road to Tierra del Fuego

The motor road of some 2,000 miles from Buenos Aires to Ushuaia in Tierra del Fuego is now under construction and, according to the Argentina National Roads Board, will be completed by the end of 1938. It is understood that this new road will follow the Atlantic coast line for the greater part of the route and present estimates indicate the total cost will be about 28,000,000 pesos.

TO BID AND STILL MAK

...FIGURE ON USING Faster Power

Here a fast-moving Model LO, pulling a Gar Wood scraper, gains extra trips regularly and at the same time cuts finishing costs by spreading the load in even layers.

TO DETERMINE YOUR COST PER YARD CHECK THESE IMPORTANT POINTS AGAINST YOUR EQUIPMEN

☐ INITIAL COST ☐ TIME LOSSES FOR REPAIRS ☐ COST OF LUBRICATING OIL
☐ WORKING SPEEDS ☐ STARTING TIME ☐ WORKING LIFE
☐ UPKEEP COST ☐ COST OF FUEL PER GALLON ☐ TRADE-IN VALUE

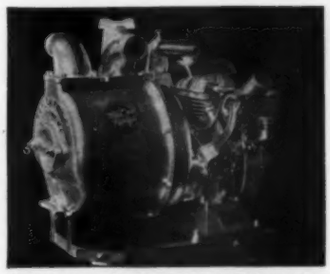
If you use Allis-Chalmers equipment you'll find your final cost per yard low enough to consistently win job awards and still make a good profit.

ALLIS
TRACTO VISIO

Two New Pumps

Two new light-weight pumps, one a 2-inch model weighing 98 pounds with two starting methods and a 4-cycle engine and the other a 3-inch model weighing 108 pounds and also having two starting methods and a 4-cycle engine, were recently announced by Marlow Pumps, Ridgewood, N. J. Both units are self-priming centrifugals, made of aluminum, with automatic recirculation control. The 2-inch model has a capacity up to 120 gpm and the 3-inch model up to 180 gpm.

The Marlow patented automatic valve provides quick removal of all air entering the suction line and full capacity the instant the pump is primed. The 4-cycle engine has a removable cylinder head, tapered roller bearings, heat-treated and counterbalanced crankshaft, poppet-type valves and valve set inserts.



One of the New Marlow Light-Weight Pumps

The automatic shaft seal eliminates packing entirely. The special aluminum alloy of which the pump castings are made is resistant to salt water and mild acids.

Both these new pumps are described and illustrated in Bulletin CEM-22, copies of which may be secured without obligation direct from the manufacturer by mentioning this magazine.

A ⅜-Yard Power Shovel For Basement Excavation

An interesting pocket-size folder describing and illustrating the application of a Bucyrus-Erie ⅜-yard power shovel to basement excavation has recently been published by the Bucyrus-Erie Co., South Milwaukee, Wis. This quick modern method of excavation has proved very profitable to many contractors, according to this folder.

Complete information on the 10-B shovel and the light pneumatic-tired trailer for transporting it from job to job is contained in this new folder, copies of which may be secured direct from the manufacturer by mentioning this magazine.

Rules for Roadside Planting in Carolina

(*Continued from page 19*)

willow oak, water oak, sugar maple, pin oak, elm, linden, live oak, and red oak. Native species of evergreens, although highly recommended for informal roadside planting, are not generally adaptable to use in formal rows, because their usual dense foliage close to the ground tends to break up the panoramic view of the surrounding countryside to a greater extent than clean-trunked deciduous trees.

9. *Flower Beds.* The use of beds of annual or perennial flowers is not recommended because of difficulties of maintenance. Naturalization of native wild flowers along the edges of woodland areas, however, is recommended.

Easements

10. *Planting on Private Property.* If, because of limitations of right-of-way or presence of pole-lines, it is necessary to plant on private property to obtain effective results, an easement from the property owner shall first be obtained.

11. *Maintenance.* The Commission will maintain, insofar as funds, equipment and personnel will permit, all plantings made on the right-of-way or on private property covered by an easement as mentioned above. A clear and definite agreement as to responsibility for maintenance shall be reached before plantings are made.

12. *Exceptions.* Any exception to the above regulations can be approved only after an investigation of the location and conditions of the proposed exception by a representative of the Commission.

Long Island Completes 18 Grade Separations

The construction of eighteen grade separation structures along the route of the Northern-Wantagh State Parkway Extension in Nassau County, Long Island, N. Y., was recently completed. This 10-mile extension to the Long Island State Parkway System begins at the present easterly terminus of the Northern State Parkway at Glen Cove, extends through the Village of Westbury and connects with the completed Wantagh State Parkway to Jones Beach at the junction with the Southern Parkway.

An initial state appropriation of $1,600,000 was made available last year for the construction of all the grade separations on this project. Immediately thereafter, ten contracts for eighteen structures were let by the State Department of Public Works, and by the middle of the summer active work on all structures was well under way.

An additional appropriation of $2,830,000 has just been made by the State Legislature for the completion of this parkway, including grading, drainage, paving and landscaping and the contracts will be let at once. It is expected that the entire project will be completed by the end of the year.

The parkway design provides for divided concrete roadways, each two lanes wide and separated by a 9-foot landscaped mall. Bridges are of ornamental stone-faced design. Access drives will be provided at various points, so designed that they will minimize interference with through parkway traffic.

The completion of the Northern-Wantagh State Parkway Extension will provide a direct parkway route, 40 miles in length and free of all grade crossings, from Manhattan and the Bronx via the Triborough Bridge, and from Brooklyn via the Interborough Parkway, to eastern Long Island and Jones Beach State Park.

LKE PROFIT$

Can you make a profit if your bid gets the job? A-C users do. You can figure, as *they* do, on moving dirt at a lower cost per yard. You begin by having a lower equipment charge-off per yard. Here's why: A-C tractors are designed to eliminate extra, pay-robbing deadweight, consequently you get more power per pound of weight and pay less per horsepower for it. Next, your operating costs are lower per yard because A-C Controlled Ignition Oil engines deliver a smooth flow of power that eliminates destructive engine pounding and reduces the expense and time loss of repair work. Fuel and lubricating costs are lower, too ... no starting motor expense ... you use standard engine lubricating oils, save 20 cents or more per gallon; burn any clean Diesel fuel or furnace oil, at savings up to 3c per gallon. Finally, your cost per yard is lower because you get more done with the ***Faster Power*** of Allis-Chalmers tractors. They start instantly in all weather and go right to work. You have plenty of reserve power for loading and quick grade climbing; ***Faster Power*** for gaining extra trips.

You can't make profits with idle machinery. Allis-Chalmers equipment moves dirt profitably—at figures that enable you to get jobs.

SEE YOUR ALLIS-CHALMERS DEALER!

ISCHALMERS

CTOR VISION—MILWAUKEE, U. S. A.

Two SO's and an LO pulling Continental scrapers in a railway cut. Tough material, but the Continentals load fast, ramble to the fill in a hurry because SO tractors "shift on the go" like a truck and travel at higher speeds.

Here a New York contractor saves small shovel costs, loads 120 trucks of 3½-yard capacity in an 8-hour shift with a Model WM tractor and Hough Loader.

KO and Baker bulldozer cutting costs by moving rock, ordinarily a job for shovel and trucks.

Controlled Ignition
OIL TRACTORS

The New CMC Dual Prime Pump

New Centrifugal Pump With Pneumatic Tires

A new line of Dual Prime centrifugal pumps in standard sizes from 2-inch to 6-inch, inclusive, has been announced by Construction Machinery Co., Waterloo, Iowa. The 10M and 15M of this series are already in production.

These pumps have dual priming jets with simplified recirculation control and a specially designed highly efficient impeller and volute. The 3-blade trash-type impeller, the CMC Permaseal, flanged suction and discharge connections, adjustable impeller, and close-coupled construction are additional features. The manufacturer states that all CMC Dual Prime pumps will exceed all standards and capacities established by the Contractors' Pump Manufacturers Association.

In addition to the sizes mentioned above there will be a light-weight model. Rubber-tired or steel wheels are available on most sizes. Literature will gladly be sent on request.

A New 1½-Yard Shovel

One of the features of the new Koehring 603 shovel recently announced by Koehring Co., 3026 W. Concordia Ave., Milwaukee, Wis., is the selective swing speed which makes available two fast swing speeds to suit best the operating conditions and increase the number of bucket or dipper loads per hour.

The Koehring 603 1½-yard shovel is fully convertible as dragline, crane, trench-hoe, as well as for pile-driving operations. Convertibility is quickly and easily accomplished, without shaft or drum removal. Another feature of Koehring shovels is the independent and positive crowd, making possible efficient operation in restricted areas. Heavy-duty construction, enclosed gears, and anti-friction bearings are other features.

A new bulletin on the Koehring 603 has recently been issued and copies may be secured by those interested direct from the manufacturer.

PILE HAMMERS and EXTRACTORS
HOISTS—DERRICKS
WHIRLERS
•
Special Equipment
Movable Bridge Machinery
•
Write for descriptive catalogs.
McKIERNAN-TERRY CORP.
19 Park Row, New York
Distributors in Principal Cities

Asphalt Institute Officers

At the annual meeting of the Board of Directors of the Asphalt Institute, representing three-fourths of the asphalt-producing industry in the United States and Canada, Joseph S. Helm of the Standard Oil Co. of New Jersey was elected President for the fiscal year beginning April 1, 1938. B. L. Boye of Socony-Vacuum, the retiring president, was made Chairman of the Executive Committee.

Other officers elected were: Vice Presidents, James A. Blood of the Standard Oil Co. of California, T. M. Martin of Lion Oil Refining Co., and A. M. Maxwell of Standard Oil of Ohio; Treasurer, Herbert Spencer of Standard Oil of New Jersey; Secretary, F. V. Widger of The Texas Co. The Executive Committee includes Boye, Blood, Helm, Martin and David Waxman of Shell Petroleum Corp. J. E. Pennybacker continues as Managing Director.

President Helm announced that in spite of the depression the consumption of asphalt during 1937 exceeded that in 1936 by 1 per cent, reaching an all-time high 17 per cent above the 1929 level. This he ascribed largely to the development of the farm-to-market road program, the total mileage of these low-cost all-weather roads now having passed 100,000.

MORE PAY IN EVERY PAYLOAD FOR CONTRACTORS

1938 Ford V-8 Trucks and Commercial Cars have been built to do more work, in less time, at lower cost. Time-proved features, including the famous Ford V-8 engine and the 1938 improvements and refinements, put more pay in every payload.

The Ford V-8 engine is speeding up work for many companies—it continues to roll up new records for performance and economy. The 85-horsepower Ford V-8 Truck engine powers the new 134-inch and 157-inch wheelbase trucks. A choice of either the "85" or "60" V-8 engine is offered in the new 122-inch wheelbase one-ton trucks and the 112-inch wheelbase commercial cars.

The Ford Engine and Parts Exchange Plan is another reason why owners find Ford units profitable and economical to operate. When an overhaul does become necessary, this plan saves time and money—keeps units on the job.

The nearest Ford dealer will lend you a 1938 Ford V-8 Truck or Commercial Car without charge or obligation to make an "on-the-job" test with your own loads and your own driver.

FORD V-8 TRUCKS
AND COMMERCIAL CARS

Sardis Dam

(*Continued from page 2*)

the digging of the downstream toe drains 300 feet wide and varying in depth from 8 to 18 feet, all involving 2,739,000 cubic yards of excavation; the construction of 5,500 feet of earth dikes at the two ends of the dam; core plugs at the center end sections of the hydraulic fill; and cofferdam dikes upstream along the temporary diversion channel through the dam between the core plugs, involving a total of 1,986,000 yards of fill.

Toe Drain Excavation

Satisfactory material excavated from the toe drains is being used in the core plugs while excavation from the spillway section will be used in the embankment at the north end of the dam. The material stripped from the base of the dam and from the toe drains has been used in the cofferdam dikes as the presence of moderate amounts of organic material in these temporary dikes does not create any hazard.

Excavation of the toe drain was started on the south side of the river, as the contractor was required to complete this section with the south core plug and cofferdam by November 15, 1937, or be liable for liquidated damages of $500 per day. The reason for this date of completion was that the U.S. Engineers expected to have the new dredge ready at that time to start work on the south section. The date of October 1, 1938, is set for the contractor to complete the north core plug, coffer dike and toe drain, and December 20, 1938, for the two end embankments. By the contractor's being out of the south section by the date set, the dredge could start there and the contractor continue on the north section. Then his work on the two embankments can be continued up to the final date without interfering with the work of the dredge.

The contractor worked two outfits on the toe drain excavation. They consisted of two Lorain 75B draglines loading to a fleet of twenty-four Hug and International trucks with 2 and 5-yard bodies and five LeTourneau Carryall 12-yard scrapers. The initial stripping was done with both outfits and then the draglines took over the cutting of the deeper section at the downstream end of the toe drain so as to provide drainage of the previous material and make work faster for the hauling units at all times. The dragline units and the Carryalls were worked in separate sections because of the character of loading. Usually there were three separate dirt-moving outfits with the two draglines separated and the Carryalls working between. It was possible to work the Carryalls in wetter material and consequently sooner after rains than the trucks. Also the Carryalls worked the night shift. The deep end of the toe trench was drained by an 8-inch Sterling centrifugal pump powered by a Waukesha engine.

Light for the work was furnished by the Mississippi Power & Light Co. until the TVA high line was completed through to Sardis dam site. On January 31 the shift was made, lighting for all work and power for the dredge now coming from TVA.

The Carryall outfits worked in 7-hour shifts and the two dragline outfits the same, with the greasing being done between the shifts and by splitting the Carryall units. The contractor moved an average of 7,000 yards per 24-hour day with these outfits and under all weather conditions.

The permanent drainage pipe in the toe drain of the abutment dikes consists of 1,560 feet of 24, 18 and 12-inch perforated corrugated pipe laid in a trench and backfilled with gravel.

The Dredge Pontotoc

Within 25 feet of where it is now working, the dredge was assembled of Douglas fir. It is a 170 x 47-foot barge with a draught of 6 feet and carries two electric-driven 24-inch dredging pumps in tandem capable of delivering dredged material through 15,000 feet of 24-inch pipe. Two 3,000-hp Westinghouse motors drive the pumps. The ladder is 60 feet in length, the cutter head 8 feet in diameter operating at 25 rpm by a 400-hp motor and having a 27-inch suction pipe.

The delivery pipe is carried on a trestle 8 feet above the grade of the hydraulic beach on the dam and then as the beach builds up the pipe is moved in and raised to the next lift. The material is deposited from holes in the bottom of the pipe so that there is control of the actual place of delivery. This is the same method of operation as used at Fort Peck. The Pontotoc was in operation by March, 1938, backfilling the toe drains with sand and starting the hydraulic fill in the south section of the dam.

The initial dikes for the hydraulic fill was made with draglines and then the use of the trap pipe made unnecessary the use of further dikes. The core plugs which will act as the dikes at the center of the structure will measure 400 x 500 feet at the base and 95 feet high when completed.

Initial Day-Labor Work

Clearing of the reservoir area began July 21, 1936 with WPA labor, with a maximum employment of 720 men daily. The clearing of the 1,014 acres was done with man-power with most of the stumps being completely blown from the ground by dynamite, then piled for burning later when dry. This clearing included the base of the dam, the borrow pits for the use of the contractor and 3,500 feet into the reservoir. In addition the grubbing included 419 acres of the base of the dam and the borrow pit areas.

Personnel

The work at Sardis Dam is under the direction of Lt. Col. Raymond G. Moses, District Engineer, U.S. Engineer Department, Vicksburg, Miss., with Major John B. LaGuardia as Project Engineer at the site. For the Hooper Construction Co. on its work, R. B. DuBose is General Superintendent and Lamar Smith, Superintendent.

Concrete VIBRATORS
AND GRINDERS
Write for Circular on types, sizes and prices
White Mfg. Co.
ELKHART INDIANA

Badger State builds better roads cheaper with *Continentals!*

County Highway Department		Model
1	Brown	CS7A
2	Clark	CS7A
3	Columbia	CS5B
	Columbia	CS7A
4	Dane	CS7A
5	Dodge	CS10A
6	Eau Claire	CS4B
7	Fond du Lac	CS7A
8	Iron	CS5A
9	Jefferson	CS7A
10	Ozaukee	CS7A
11	Kewaunee	CS7A
12	Polk	CS7A
	Polk	CS7A
	Polk	CS7A
13	St. Croix	CS4A
14	Taylor	CS5A
15	Trempealeau	CS7A
16	Walworth	CS7A
17	Washington	CS7A
18	Winnebago	CS7A

This list includes Continentals owned by Counties only.

Sold and serviced by Allis-Chalmers dealers everywhere. In Wisconsin and the upper peninsula of Michigan by the Drott Tractor Company of Milwaukee.

It didn't take State and County officials and contractors of the progressive State of Wisconsin long to realize that Continental Wagon Scrapers are the ideal low cost dirt moving units for highway building, relocation and maintenance work. Eighteen counties in the Badger State are cutting costs with from one to three Continentals.

Wisconsin, Washington or West Virginia — it's all the same to a Continental — they dig while they load while they haul, and backdump like a truck, over a bank, against a wall, in tight places. They take cuts from wafer thinness to a foot thick, any kind of dirt quickly boiling up into the big bucket. They hog out and load anything the tractor can pull through: imbedded rocks, tree roots, gumbo, wet sticky clay, shot rock, etc., with a minimum of tractor power.

They level, grade, spread, dump in windrows, or stock piles. They use no maze of cables and sheaves, just simple, highly dependable hydraulic jack units. They require little maintenance and are still digging dirt long after they've paid for themselves many times over. Made in 4, 5, 7 and 10 yard sizes mounted on tired-wheels or crawlers.

They're the fastest dirt movers on wheels — ask the boys up in Wisconsin!

CONTINENTAL ROLL & STEEL FOUNDRY COMPANY
Tractor Equipment Division
Railroad Avenue
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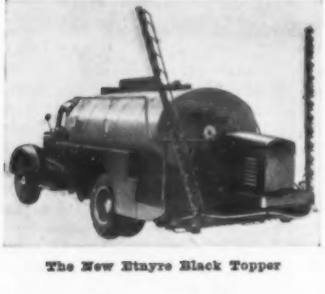
CONTINENTAL WAGON SCRAPERS



The New Etnyre Black Topper

Spray Bars Feature Of New Distributor

The new 1938 Etnyre Black Topper bituminous distributor, three of which were exhibited at the Road Show in Cleveland, has a number of interesting features, the most outstanding of which are the two new non-drip spray bars which, according to the manufacturer, deliver even, uniform applications of asphalt, road oil or tar without drips, leaks, skips or streaks.

One of these new bars is the full-length circulating type, wherein the fluid circulates the complete length of a 24-foot bar, or wider, with the bar in horizontal operating position or with the end sections raised. This bar has an instant valve shut-off at the nozzle and any width can be sprayed simply by disengaging the valve lever, without the necessity of plugging the nozzles. The other new Etnyre bar is known as the siphon cut-off type. The nozzles of both bars are spaced at 4-inch intervals. Both bars can be adjusted quickly to give a triple-lap spray to insure uniform application.

Another new feature is the Vacu-Flo whereby the high vacuum available from the Etnyre pump is used to draw all fluid from either type of bar, leaving the bar clean and preventing freezing or dripping. The bars and header lines slope to a low point where the vacuum line picks it up and drainage is free and complete, according to the manufacturer. The bars, which as standard are 24 feet in length, shift 18 inches laterally to enable the operator to follow a line.

Weight has been reduced up to 1,200 pounds by the frameless mounting, standardized for all makes of trucks and trailers, and by the modern streamlined design. A protective steel skirting is used on both sides of the distributor, covering the fuel and air tanks on the right side, incorporating a steel tool-box with pilfer-proof lock, and covering the intake line on the left side. This skirting also provides a trip-proof walk, enabling the operator to get to any part of the distributor quickly. Additional safety features are the hinged pressure-relieving manhole cover and an inside cut-off valve that gives a double cut-off of material between the tank and the pump.

The Hi-Speed heating system, using Etnyre double burners, passes continuous heat through twelve flues in the tank, four large main flues and eight smaller return flues. With the shortest possible connection from the tank to the pump and to the spray bars and with the pump enclosed in insulated housing, there is no heat loss and the distributor can go into action quickly even in cold spring and fall weather.

By the use of air controls, located in the cab of the truck, the driver can operate and control the spray bars. Other features of this unit are the new streamlined engine with two-speed transmission, mounted close to the tank; a tachometer or Bitumeter with fifth-wheel-drive assembly as standard equipment; and a powerful Etnyre rotary pump with only two moving parts and equipped with a pump tachometer which meters the fluid, pumping no more than it sprays.

Further information on these 1938 Models FC and FX may be secured direct from the manufacturer.

New Hydraulic Hoist And Dump Truck Body

The Anthony OK hydraulic hoist, recently announced by the Anthony Co., Streator, Ill., is entirely new in design in that it combines the features of both the arm-lift and pusher type of conventional hydraulic hoists and lifting mechanisms. The two-arm lifting mechanism, which compounds the power developed in the pump and cylinder, is employed when the lifting is heaviest or the greatest power is needed, as in starting the load and carrying the load up to the first 25 degrees. From that point on to the full dumping angle of 50 degrees the straight pusher type principle is used, with the special feature that the pushing stress or strain is distributed throughout the longitudinal structural members of the tipping frame.

This new hoist, designed for hydraulic-hoist dump bodies of from 7 to 8 feet in length and with capacities ranging from 1½ to 3 cubic yards, permits a much lower mounting on the chassis frame than usually employed, although all the parts of the hoist mechanism and dump body remain above the chassis frame.

Complete information on this new hoist may be secured by those interested direct from the manufacturer by mentioning this magazine.

GAIN GREATER PROFITS FROM SMALL JOBS!

Rex 3½-S TILTER

FASTER TOWING
Because it has automotive type springs and pneumatic tires.

EASIER SPOTTING
Because it is lighter weight and more finely balanced.

BETTER MIXING
Because it has the Rex mixing action that cuts the batch 21 more times a minute.

Other Rex Mixers from 5-S to 14-S—
Write for our 1938 Mixer Bulletins!

CHAIN BELT COMPANY
1666 West Bruce Street, Milwaukee, Wisconsin

REX CHAIN BELT COMPANY OF MILWAUKEE CONSTRUCTION EQUIPMENT

HERE'S THE *Formula* FOR EASIER, BETTER CONCRETING

CONSTRUCTION of the Federal Housing Administration's Parkside Housing Project at Detroit has gone along rapidly and smoothly, thanks to the wisdom and experience of the general contractors – John Griffiths & Son Co., of Chicago. A highly important contribution to the success of construction, has been the use of calcium chloride in the concrete.

By accelerating the setting and hardening of concrete, the use of calcium chloride—together with ordinary protective measures—permitted and made safe the pouring of concrete throughout the winter. But that's not all. The savings resulting from the use of calcium chloride are reflected all down the line.

In speeding the progress of concrete construction, calcium chloride decreases the time lost between the different operations. Faster finishing is possible. Increased workability of the concrete makes it easier to fill the forms, and quicker removal of forms permits finishing to follow pouring in shorter order—at the same time, releasing the forms for early re-use. In cold weather work, less canvas is needed and less coke is burned in the salamanders, because with calcium chloride in the mix, concrete attains safe strength in shorter time.

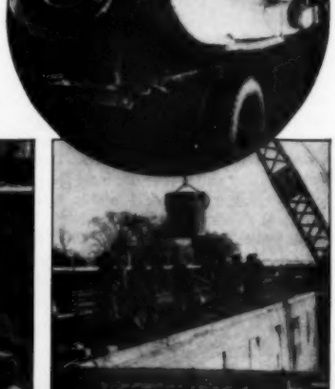
And to top it all—the use of calcium chloride produces better, stronger concrete, by government tests.

Until you have actually used calcium chloride in concrete, it's hard to appreciate the full extent of its value. But once you have experienced its benefits, you'll not pour concrete without it.

WRITE FOR EVIDENCE

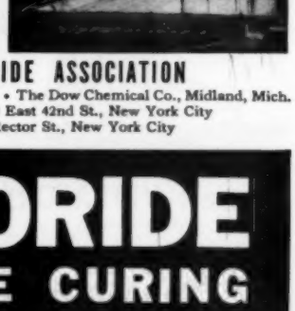
Any of the firms listed below will gladly furnish complete information on specifications and methods of using calcium chloride in concrete, together with technical reports of the National Bureau of Standards, Highway Research Board, American Society for Testing Materials, and other recognized authorities. Write for this data today.

A few of the 39 buildings which comprise F. H. A. Project H-1205, at Detroit.



Concrete, containing calcium chloride admixture, is loaded at the plant of Thomas E. Currie Co., Detroit, and mixed in transit.

Arrived at the project, the concrete is elevated by means of crane and bucket, and pouring is accomplished rapidly and easily.



CALCIUM CHLORIDE ASSOCIATION

The Columbia Alkali Corp., Barberton, O. • The Dow Chemical Co., Midland, Mich.
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CALCIUM CHLORIDE
FOR MODERN CONCRETE CURING

Close-Up of the Oiler Teeth, Showing the Oil Tubes at the Heels of the Teeth

Stabilizing Road Base by Sub-Oiling

(*Continued from page 12*)

cent SC-3 road-oil emulsion was used. The next 0.4 mile was sub-oiled with a 60 per cent MC-3 cut-back asphalt emulsion. The following 0.4 mile received 60 per cent SC-3 liquid asphalt material emulsion (a flux oil), the next 0.4 mile received a mixture of 50 and 60 per cent SC-3 flux-oil emulsion, and the remainder of the project was sub-oiled with a MC-3 cut-back.

FAP 337C—The entire 4.002 miles was treated with SC-3 road oil.

FAP 337D—The entire 3.461 miles was treated with SC-3 road oil.

FAP 337E—This project was 3.879 miles long. The first 0.7 mile was treated with SC-3 road oil. The next 0.4 mile was sub-oiled with 50 per cent MC-3 cut-back asphalt emulsion. The following 0.3 mile received SC-3 road oil, while the following 0.5 mile was treated with 50 per cent No. 306 flux-oil emulsion. The following mile was treated with SC-3 road oil, and the next 0.3-mile section had a treatment of 56.1 per cent SC-3 road-oil emulsion. The next to last section, 0.2 mile in length, was sub-oiled with a 50 per cent synthetic asphaltic emulsion, and the last section of approximately 0.5 mile received a 50 per cent "blend of No. 306 flux oil and synthetic asphalt" emulsion.

Method of Sub-Oiling

The sub-oiler used by Midwest Precote Co. consisted of thirty-one teeth similar to scarifier teeth with ½-inch holes cast and ¼-inch nozzles for the flow of the bituminous material from the pipes to which the 18-inch teeth were welded. The outlet at the bottom of the teeth was in a recess, like a raised heel of a foot, behind the plow section of the teeth. The teeth were arranged in two V's staggered so that there was a 3-inch space between the center line of the two rows of teeth. Three teeth on a short cross bar at the center behind the V's completed the arrangement. The sub-oiler was 7 feet 4 inches wide, permitting the treatment of that width of base in one passage through the base. It was pulled by an RD7 tractor. The double V frame of the sub-oiler was carried by single wheels in front and dual wheels in the rear on which was mounted the engine and pump for handling the bituminous material from the 750 to 800-gallon service trucks to the oiler teeth. The same engine also supplied power for the hydraulic controls for raising and lowering the oiler teeth, and controlling the rate of flow of the bituminous material.

Treatment Following Sub-Oiling

After the sub-oiling had been completed on any section, the surface was bladed lightly to smooth over the slight ruts left by the oiler teeth, and the bituminous material allowed to disperse itself. The only exception was where the sheepsfoot and pneumatic rollers were used. The sheepsfoot roller was used alone on 2.4 miles of FAP 337B where the emulsion was applied.

Reconditioning

For the reasons stated at the beginning of the article it was necessary to recondition the base as the bituminous materials did not, in general, disperse as anticipated. There were cases where the materials did come up in the lines where the teeth went down in applying the bituminous material. The first step in reconditioning was to scarify the base course to the full depth of the bituminous application. Then the material was bladed smooth and disked to a depth of 4 to 5 inches to break up the bituminous material where it had not dispersed. Then the blades were used to cut the edges back toward the middle and split the middle windrow to side windrows with the disc following the blades throughout the operations to continue breaking up the clods of bituminous material. The 14-inch double discs were effective in breaking up clay clods as well as the lumps of bituminous material. When the entire mass was well blended and mixed it was bladed back to section with a 5 to 6-inch crown on the 22-foot width and "sheepsfooted" with a Blaw-Knox roller pulled by a Cletrac 35 and shaped with a motor patrol. The final operation was surface rolling with a 3-wheel Austin 5-ton roller.

Results

As far as any difference in results is concerned, at this time there are none. The entire dispersion of the original application, with the exception of the emulsions, was a failure but the reconditioning of the base with the blades has made the mixtures homogeneous and there is little doubt but that they will prove successful over a period of years as the bituminous materials will waterproof and slightly bond the base

(*Continued on page 40*)

"SPEED-QUALITY"

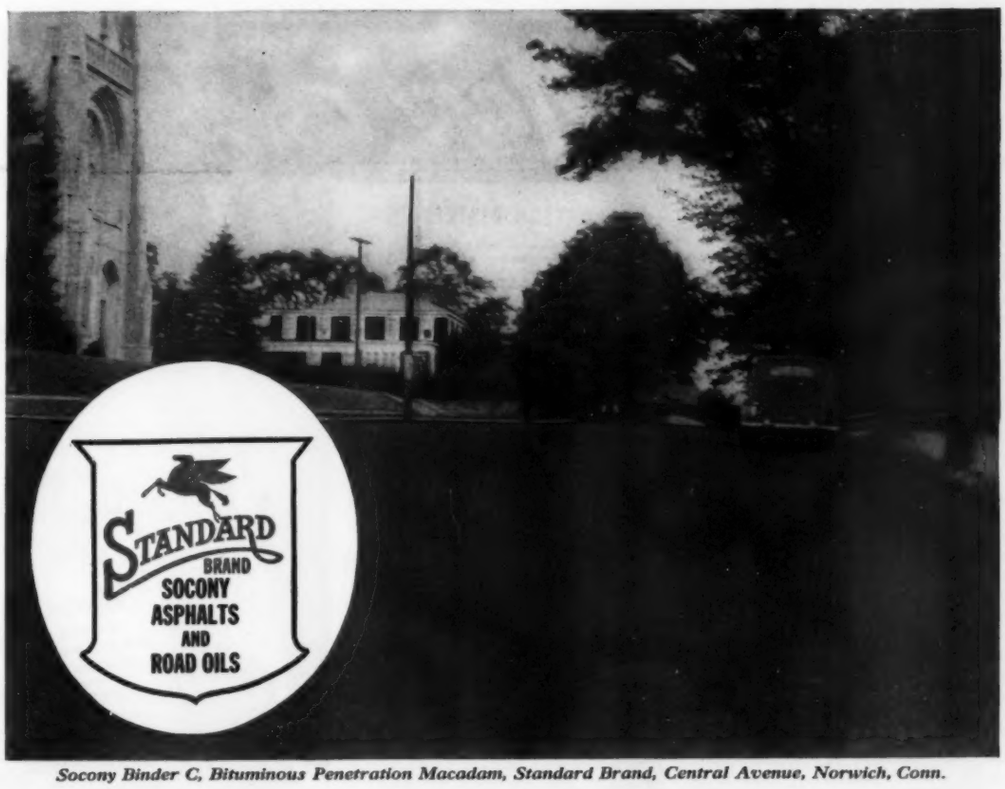
"FLEX-PLANE" Finishing Machine—forward and backward screeding—20" wide screed—four speeds.

"Contraction Joint"—⅛" ribbon—shrinkage is nil—it's water-tight.

Dowel Rod Spotter—gauged from the forms.

FLEXIBLE ROAD JOINT MACHINE CO.
WARREN, OHIO

ANOTHER GOOD ROAD MADE BY GOOD ENGINEERING AND GOOD PRODUCTS



Socony Binder C, Bituminous Penetration Macadam, Standard Brand, Central Avenue, Norwich, Conn.

SOCONY Asphalt Road Oils • Socony Asphalt Joint Fillers • Socony Waterproofing Asphalt • Socony Cut-Back Surfacing Asphalt • Socony Asphalt Binder A for surface treatment • Socony Refined Asphalt for sheet asphalt paving • Socony Cold Patch Asphalt for all types of patching • Socony Asphalt Binders B & C for penetration work (Asphalt Macadam) • Socony Paving Asphalt 51-60 and 61-70 Penetration for the mixing method (Asphaltic Concrete) • Socony Asphalt Emulsions • *Specifications and all other particulars furnished on request.*

SOCONY-VACUUM OIL CO.
INCORPORATED
STANDARD OIL OF NEW YORK DIVISION

Underpasses Lighted For Safety in Nevada

(Continued from page 21)

Las Vegas Structure

In the City of Las Vegas, Nevada, a large underpass structure was completed in August, 1937. This underpass connects Clark Avenue (State Route 5) with U.S. Route 91, the Los Angeles-Salt Lake City highway. The need for this structure is indicated by a traffic count of 4,800 cars in 24 hours. The structure is of concrete and steel with structural steel members on concrete abutments carrying three main-line tracks of the Los Angeles and Salt Lake Railroad. Its length, including ramps, is about 800 feet. For the illumination of the portals and ramps of this underpass seven G-E sodium-vapor units mounted on Union Metal standards were installed. The length of the underpass itself was such that it could not be properly illuminated by the portal units alone. Hence two G-E tunnel-type luminaires were mounted on opposite sides in the two apertures between the three tracks, thus providing the needed illumination without glare. These units were mounted approximately 14 feet above the highway surface. Other units on standards were approximately 22 feet above the roadway.

As in the Alameda-Wells and West Second Street Underpasses previously discussed, this underpass also provides for pedestrian travel by means of two well-lighted pedestrian tunnels. Flush ceiling-type incandescent lights with rippled glass were specified for these tunnels.

Latest Installations

In Reno two modern concrete and steel bridges spanning the Truckee River were completed in August and September, 1937. These bridges are located in the heart of the City and were built to alleviate the traffic congestion on the existing bridges which link the north and south portions of the City.

Obviously the question of providing adequate illumination for these bridges was of primary importance and the design of the type of lighting was carried on concurrently with the bridge designs. Each bridge is of the continuous girder type, with three spans. On both sides of each bridge is a concrete railing spaced by four pylons, on which the General Electric 6,000-lumen incandescent lighting units were placed. Metal mounting standards, octagonal in shape, were painted a bronze finish to match the bronze metal straps of the luminaires. The high level of luminosity, without glare, over the roadway provided by the luminaires of each bridge, insures comfort and safety to traffic.

Future Plans

To our best knowledge these underpass installations of sodium-vapor lighting are very satisfactory to the traveling public. If in time they prove to be the best type of lighting available, we shall continue with similar installations on grade-separation structures located in or near municipalities where warranted by the density of travel.

Steel Paving for Bridge Construction or Repair

Kerlow steel flooring in the open bridge grating or filled bridge slab types for use in the construction of new bridges or the repair of old structures is made by the Kerlow Steel Flooring Co., Jersey City, N. J., manufacturer also of monolith bridge and floor slabs, armoring and highway expansion joints.

Details of this steel flooring, including dimensions and weight per square foot, are contained in literature which interested contractors and bridge engineers may secure direct from the manufacturer by mentioning this magazine.

ANNOUNCING!

A road mixing Drag for retread surfacing, surface treatment and levelling courses. An old proven method with the new patented "floating" mixer blades. Here are some of its advantages:

(a) Segregation practically eliminated.
(b) Mixes thoroughly with one pass.
(c) Mixing units are short and floatably mounted so they follow the contour of the road.
(d) Old road surface cannot be torn up as units are independently mounted so they pass over high spots.
(e) Pulled by any standard tractor.
(f) Will produce a low cost, smooth riding surface without the need of auxiliary equipment.

A NEW BITUMINOUS SURFACING DRAG

Write for more information and the new Bulletin N-20, NOW.

LITTLEFORD

LITTLEFORD BROS.
485 EAST PEARL STREET
CINCINNATI, OHIO

New and Different TRUCK DATA

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MO., Kansas City, Keystone Trailer & Equip., 2100 E. 10th St. St. Louis, McCabe-Powers Auto Body, 1217 N. Broadway.
MONT., Butte, Anderson Motor Co., 324 S. Arizona St. Billings, Hines Motor Supply. Bozeman, Hines Motor Supply. Great Falls, Hines Motor Supply. Havre, Hines Motor Supply. Lewistown, Hines Motor Supply. Miles City, Hines Motor Supply. Shelby, Hines Motor Supply.
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NEV., Reno, Allied Equipment, Inc., 545 E. 4th St.
NEW JERSEY, Newark, Wheels, Inc., 225 Warren Ave.
NEW MEX., El Paso, Tex., Watkins Motor, 415 W. San Antonio.
NEW YORK, Buffalo, Truck Equip., 1781 Fillmore Ave. Long Island City, Truck Equip. Co., 45-36 27th St. Rochester, Truck Equip. Co. Syracuse, Truck Equip. Co., 213 Plum St. New York, Export-Imperial Export, 64 Whitehall St. New York, Wheels, Inc., 1116 Ave. at 50th.
N. CAR., Charlotte, Baker Equip. Eng'rg, 300 W. Morehead.
OHIO, Cambridge, Allison Body Sales, 914 Gaston Ave. Cleveland, L. A. Holmstadt, 1501 Payne Ave. Columbus, Hercules Body Sales, 500 Hamlet St. Toledo, Turner Brake Service, 111-13 14th St. Toledo, H. S. Watson Co., P. O. Box 385.
OKLA., Tulsa, Braden Winch, 1007 E. Admiral Blvd. Oklahoma City, H & H Equip., 415 Northwest 6th.
ORE., Portland, Wheel & Rim, NW 14th Ave. & Everett.
PENN., Philadelphia, Truck Equip. Co., 1111 Frankford Ave. Pittsburgh, Schnabel Co., S. 10th & Muriel.
TENN., Chattanooga, A. Fennacht & Sons, 111 W. 13th St. Memphis, Carter Mfg. Co., 1152 Raman St.
TEXAS, Ft. Worth, Hobbs Mfg. Co., 609 N. Main St. Houston, Hobbs Mfg. Co., 3100 McKinney Ave. Corpus Christi, Truckers Equip., 1501 Flint. El Paso, Karl P. Gieselman, 214 S. Mesa Ave. San Antonio, San Antonio Body, 822 Roosevelt. Sweetwater, Truck Equip. Co.
UTAH, Salt Lake City, Koegel & Love, 57 E. 7th South.
VA., Richmond, Baker Equip. Eng'rg, 1800 Summit St.
WASH., Seattle, A. B. Blacklin, 719 9th Ave. North. Spokane, Watkins-Gilkey, 1224-26 W. First.
W. VA., Charleston, Baker Equip. Eng'rg, 404 Morris.

This New Bulletin . . . contains, in addition to pictures and descriptions of new Auxiliary Transmission models, a set of tables of gear-ratios and speeds made possible with this type of unit as applied to all makes and models of trucks. . . . In other words, if you are curious to see what an Auxiliary Transmission will provide in the way of gear-ratios and speeds for any truck in your fleet, you will be able to lay your finger on the data in this folder, free copies of which will be mailed if you send the coupon to the distributor nearest you, or to us.

PASTE THIS COUPON TO A 1c POST-CARD OR MAIL IN AN ENVELOPE

Gentlemen:
Send me Auxiliary Transmission Data for _____ trucks.
Name _____
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City _____ State _____

H. S. WATSON COMPANY
1145 HARRISON STREET, SAN FRANCISCO, CALIF. P. O. BOX 385, TOLEDO, OHIO

Walking Draglines Build New Levees

Dameron & Kenyon Use Two Machines on Two Contracts Totaling 4,300,000 Yards Near Krotz Springs, La.

(*Photo on page 48*)

✦ FROM the vivacious Spanish, through the French and into English run the names of the levee sections brought to full grade during 1937 by Dameron & Kenyon of Port Allen, La. This is typical of the section that has known the ruling hand of so many races and governments. Viva-Bayou Fordoche, Items E8, A & B, and Bayou Fordoche-Lottie, Items E12, A, B and C, all in Pointe Coupee Parish, really stretches our linguistic ability to the breaking point. On the Viva-Bayou Fordoche items, Dameron & Kenyon bid in 1,240,000 yards at 10 cents and 460,000 yards at 10.56 cents for a total of $172,575. On the Bayou Fordoche-Lottie items they bid in 1,986,500 cubic yards at 10.20 cents, 438,000 at 10.92 cents and 175,500 yards at 11.25 cents for a total of $270,195.

On the Viva-Bayou Fordoche section, the material was mostly handled but once. A relatively small amount of dirt was used for interim protection levee and later one of the walking draglines was brought back and the material brought up to grade.

Equipment Used

These items were built with a Bucyrus-Monighan 6160 walking dragline with a 160-foot boom handling a 10-yard basket bucket made by Joe Hendricks of Alexandria, La., and a Bucyrus-Monighan 6-W walking dragline with a 150-foot boom and a 6-yard Warren bucket. The 6160 machine is powered with a Fairbanks-Morse 420-hp oil engine driving a 100-kw General Electric generator. An auxiliary engine, a Waukesha, drives a General Electric 1-kw generator for operating an air compressor, refueling pumps, etc. A Goulds Hydroil pump provides lubrication by forced feed to all bearings.

The 6-W is powered with a 240-hp Fairbanks-Morse oil engine and has Madison-Kipp lubrication. A Warner generator with belt drive is used for the lighting with a 1,500-watt Kohler lighting plant as an auxiliary. The 6-W, working 692 days, handled an average of 98,000 cubic yards a month. The 6160 averaged 158,000 cubic yards a month for 347 working days.

Three tractors and bulldozers, a Caterpillar RD7 with a LaPlant-Choate bulldozer and two Forty diesels with Baker bulldozers, made up the levee-dressing outfit on the Viva-Bayou Fordoche section. These outfits worked one 10-hour shift. While the tractor and bulldozers were also used on the Bayou Fordoche-Lottie section, the final dressing of the slope was handled with crescents of old rail dragged behind light tractors.

The Levee Section

The levee in these two contracts has a 20-foot crown with a land-side slope of 1 on 10. The land-side slope of the levee is 1 on 3.5 to a point 10 feet below net grade and from there a line is drawn to intersect the ground surface at a common point with the 1 on 6.5 seepage line which starts on the net river-side slope 2 feet below net grade. The river-side slope is 1 on 3½. There is a 100-foot berm from the ground point to the land-side pit and then a 1 on 2 pit slope to 10 feet below ground level from which point the pit may continue on a 1 on 8 slope as far as the contractor desired for economical handling of the material.

Personnel

Dameron & Kenyon, Port Allen, La., contractor for this work, had as Superintendents, J. T. White on the 6-W and W. J. Dugas on the 6160. This work in the Atchafalaya Basin is under the direction of the Second New Orleans District, U. S. Engineer Department, Lieut. Col. William F. Tompkins, District Engineer, and Capt. Chester K. Harding, Area Engineer.

New Road Roller Catalog

An interesting new catalog, describing and illustrating the construction features of Hercules road rollers, as well as supplementary specifications on each of the rollers in 6, 7, 8, 10 and 12-ton sizes, has just been issued by the Hercules Co., Marion, Ohio. Copies of this 12-page catalog and specifications on any or all of the rollers made by this company may be secured direct from the manufacturer.

IMPROVED! NEW! NO GRIT! NO WEAR!

FRENCH & HECHT WHEELBARROW WHEEL with NU-SEAL

Here's the wheel you've been waiting for—a sturdy, free-running Timken bearing wheel with Nu-Seal, to positively exclude destructive abrasives—sand, dust, grit. It will "stand the gaff."

Ideal for Contractors, Cement Makers, Foundries, Brick Yards, Etc.

Nu-Seal is an ingenious, inexpensive but POSITIVE means for keeping in the grease and keeping out the grit. These field-tested, practical wheels will outlast anything you've seen to date because WEAR from foreign matter has been eliminated. Their longer life will return your initial investment over and over.

No need to tell you about the benefits of air-tired barrow wheels. Add the wear-free protection of Nu-Seal and you are efficiently equipped for a long time to come. Available in sizes for 4.00 x 8" or 4.00 x 12" tires. We will supply the wheel separately from the tires if so desired.

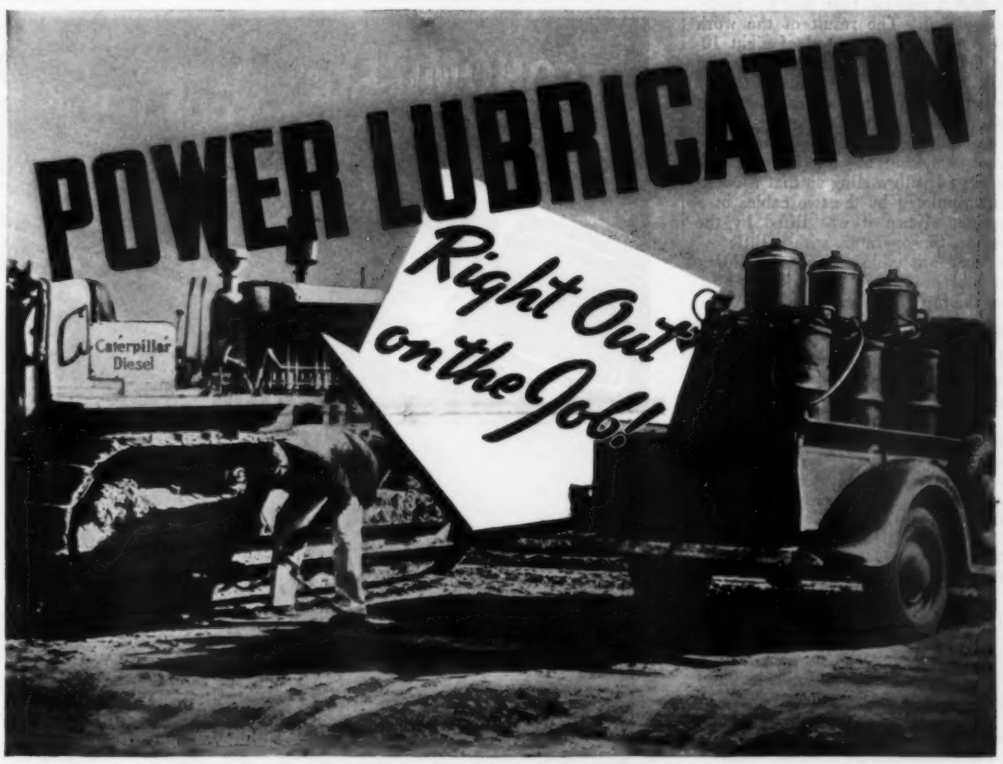
NU-SEAL

Is simple—POSITIVE—inexpensive. Keeps the Grease in—the Grit out.

Write for Descriptive Bulletin 60 and Prices

FRENCH & HECHT, DAVENPORT, IOWA SPRINGFIELD, OHIO

WHEEL BUILDERS SINCE 1888



Alemite Portable Service Station Pumps Lubricant Direct from Original Barrels

SAVE two-thirds of your tractor lubrication time by servicing high pressure fittings — gear compartments — engine crank cases — with Alemite Barrel Pumps *delivering direct from original lubricant barrels!* You can relubricate a track roller bearing in 2½ seconds! You can fill transmissions and final drives at the rate of 14 pounds per minute.

Equipment included with the Alemite Portable Service Station comprises one High Pressure Barrel Pump and two Low Pressure Barrel Pumps. The high pressure pump *takes care of all pressure gun fittings.* One low pressure pump is used to fill gear compartments; the other delivers crank case oil.

And the same air compressor which furnishes power for your Alemite Equipment furnishes air to inflate truck tires right on the job! Get all the facts now, *and let the Alemite Portable Service Station increase profits on your spring contracts!* MAIL THE COUPON TODAY!

Gasoline engine operated air compressor not only furnishes power for Alemite Power Guns, but also air for inflating tires!

ALEMITE—*A Division of Stewart-Warner Corporation*
1850 Diversey Parkway, Chicago, Illinois
Stewart-Warner-Alemite Corporation of Canada, Ltd., Belleville, Ontario

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REG. U. S. PAT. OFF.
WORLD'S LARGEST MANUFACTURER OF LUBRICATION PRODUCTS

Enjoy Horace Heidt and his Alemite Brigadiers every Tuesday Evening, National Broadcasting Company Coast-to-Coast Network, 9:00 p. m., E. S. T.

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Please give me all the facts on the new ALEMITE PORTABLE SERVICE UNIT.

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C. & E. M. Photo

Not Streamlined Perhaps But Useful! The Grease Truck with the Engine Removed for Overhauling at the Portable Machine Shop

Grading 32 Miles On Miss. Highway

(*Continued from page* 14)

tion. The trouble with the single rail was that it was too light and not easily manipulated. The result of the work was a new tool composed of eight 10-foot lengths of railroad rails spaced about 2 feet apart and laid on top of another similar group of rails at right angles but with the flanges vertical to act as cutting edges on the slopes. The device, weighing about 4,500 pounds, was rigged with a sling so that it could be manipulated by the two cables of a dragline. When it was lifted by the dragline, the operator, with a little experience, was able to cut the slopes accurately to 1 on 1, working either from the top or the bottom of the slope.

Machine Shop and Grease Truck

Napoleon remarked that an army moved on its stomach and it is axiomatic that no large body of fighting men can do their job without plenty of good food. Similarly it might be said that a construction job moves on its mechanics. If they are not on the job and see that every piece of machinery is serviced, lubricated and watched continuously, there will be breakdowns that will result in loss of time and money.

This particular job was well serviced by a machine shop on wheels with forge and anvil, electric drills, parts and small machine tools ready for instant service. A second truck parked nearby had a 2,000-watt Kohler electric plant and large floodlight so that the servicing of any piece of equipment would not be delayed by darkness. A heavy canvas awning from the top of the machine shop was supported by large posts so that either in rain or sunshine the mechanics were protected.

A full complement of welding equipment supplemented the other service machinery with a Modern Engineering Co., of Memphis, Tenn., acetylene welding outfit at the shop and another on the welding truck that could be moved quickly to the scene of any breakdown. The truck also carried a 300-ampere General Electric welder.

An accessory that proved of infinite value for the servicing of truck engines was a pair of portable pipe frames consisting of two 4-inch uprights for each end frame welded to horizontal bases of 4-inch pipe and with a pair of diagonal braces of 1¼-inch pipe. This pair of frames carried a 6-inch I-beam for a roller block so that trucks could be run in under it, the engine lifted off and swung aside to a cradle and the truck moved out, leaving plenty of room for the mechanics. General servicing and light grinding was done at the shop while the finer work requiring a fully equipped shop was sent away.

The Grease Truck played an important part in the care of the equipment on the job. As it was impossible for all the machines to be brought to the shop for lubrication, a grease truck was built to carry the grease to the machines. It consisted of a Ford truck on which was mounted a small Wisconsin engine driving a 2-cylinder Ingersoll-Rand compressor supplying air for the grease guns through an air tank mounted directly behind the driver and with the engine and compressor on top of the tank.

The truck carried a drum of transmission oil, a drum of crankcase oil, a drum of chassis lubricant, a drum of gear and bearing grease, and a drum of gasoline. This truck was able to handle the lubrication of the dragline and such other equipment as was unable to get to the shop where the greater part of the equipment was greased.

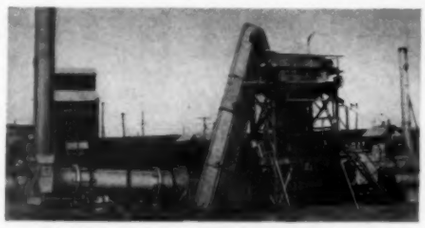
The greasing program was definite and adhered to as closely as the exigencies of construction operation would permit. The tractors were pulled out of service one at a time between the day and the night shift wherever the grease truck could catch them. Then between the night and the morning shifts all mobile equipment was pulled in to the shop for oil changes as required, and daily greasing when it had not been attended to by the grease truck out in the field. About three pieces of equipment could be completely serviced between the two shifts at night. Three greasers worked on each shift and slept in a tent near the shop when not on duty.

Another important piece of equip-

(*Continued on next page*)

MADSEN ASPHALT PLANT

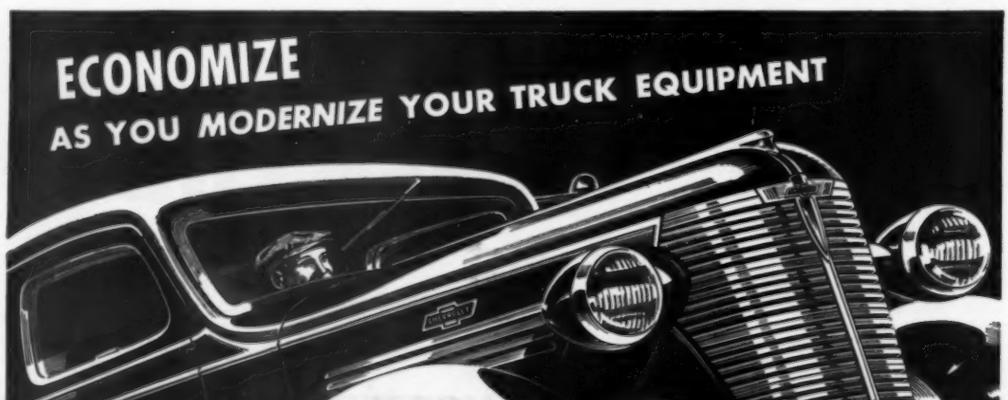
The Madsen Asphalt Plant is the finest equipment of its type. It is built in units to assure rapid assembly and dismantling, thereby providing extreme portability and low moving costs. No crane is necessary in the erection of the plant.



Remember too that a Madsen Plant holds the record in the State of California for the highest asphaltic concrete production per eight-hour day.

Write for descriptive literature.

MADSEN IRON WORKS
Manufacturers
Huntington Park, Calif.



CHEVROLET TRUCKS
give the power and performance you need . . . and with low operating and maintenance costs

MANY savings in your haulage or delivery costs may be made by modernizing now with 1938 Chevrolet trucks. Save by taking advantage of Chevrolet's low truck prices. Save on gas and oil, on daily maintenance expense—and on month-after-month upkeep costs. Chevrolet trucks lead in economy—in durability and dependability. But first, get the facts that will convince you that, regardless of the job to be done, ruggedly-built new 1938 Chevrolet trucks are the trucks for your job. Call your Chevrolet dealer today.

General Motors Instalment Plan—Convenient, Economical Monthly Payments. A General Motors Value.

CHEVROLET MOTOR DIVISION
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CHEVROLET "THE THRIFT-CARRIERS FOR THE NATION"

Six Chassis Models—Light Delivery, ½, ¾, 1, 1½ Tons (131½- and 157-inch wheelbases) • Five Wheelbase Lengths—112-inch to 157-inch • Famous Valve-in-Head Truck Engine • Perfected Hydraulic Truck Brakes • *Full-Floating Rear Axle • Extra-Strength Frame • *Four-Speed Transmission • Modern Styling • *On 1½-Ton Models.

C. & E. M. Photo
One of the Handy Lighting Towers on Skids

Largest Earth Job In 1937 Program

(Continued from preceding page)

ment was the water truck which carried water out to sprinkle the grade, supply water for the equipment when needed and for the stock. An 800-gallon welded tank was mounted on a Ford truck and alongside was a Goulds New Pyramid pressure pump driven by a belt from a 4-cycle Briggs & Stratton engine. The pump was used to fill the tank and also to pump out for use. One of its important uses which required the full pressure of the pump was washing the tractor crawlers before greasing.

Fueling and Service Trucks

The Shell Petroleum Co. had the contract for furnishing the gasoline and diesel fuel for the equipment. The company maintained one truck in almost continuous service hauling out the two fuels for this contract, making at least three trips a day from Natchez to fuel the equipment direct and also to fill the three gasoline and three diesel fuel tanks spotted over the job, each equipped with a hand pump for transferring the fuel to the tank on the machine.

Each foreman on the job had a Ford service truck so that he could move quickly over his work and also carry small supplies as needed. In addition, the materials clerk had a similar truck for hauling out the parts and supplies to the gangs working over the 32 miles of the job.

Lighting Equipment

In addition to the 2000-watt Kohler electric plants at the machine shop and the camp and one on the dragline, the contractor had three others mounted on 12 x 12 skids carrying telescoping towers with the floodlights at the top. The center post of the telescoping device, carrying the light, was raised and lowered by a small hand winch and the outer timbers were braced to the four corners of the skids by cables ending in hooks. The whole telescoping section was hinged so that by unhooking two of the front cables the tower could be let down completely for passing under low wires, a small culvert or a bridge.

The Camp

The contractor maintained a camp of about six buildings for the skilled labor who did not live in their own trailers or in town. The camp was fully equipped with electric light, hot and cold running water from a driven well and heated by an ingenious nest of old oil drums rigged at a gravity heater. There was a cook's bunk house and a clean kitchen where wholesome meals were provided for the men.

Personnel

This series of four contracts for grading 32 miles of new location of U. S. 61 south of Natchez as far as Woodville, Miss., was awarded to Chas. Weaver & Co., Inc., of Jackson, Miss., on his four bids which totaled approximately $550,000. H. S. McElroy was Resident Engineer for the Mississippi State Highway Department.

New Wear-Resisting Metal

Crobalt, a non-ferrous wear-resisting metal, the many applications for which include grade blades, scrapers, valve seat inserts and other tools subject to excessive wear, is now available through the Michigan Tool Co., Detroit, Mich.

Crobalt is a cast material consisting mainly of cobalt, chromium and tungsten which may be welded or brazed onto soft or hard steel. It is highly resistant to heat, abrasion and corrosion, including acids, and is already used particularly in the automobile industry as a cutting metal. It may be obtained in the form of welding rods, in addition to standard and special cast shapes.

South Bend

BITUMINOUS MATERIAL DISTRIBUTOR

Operated by Grant County, Indiana

1908—Thirty Years' Experience—1938

MUNICIPAL SUPPLY COMPANY
SOUTH BEND, INDIANA

P&H Carbody and Crawler frames, unit-welded of alloy steel

● You can be mighty sure that the steel manufacturers know their steels! And they'll tell you that the new rolled alloy steels, unit-welded, are far stronger—far lighter—far better than heavier castings bolted or welded together. P & H has been first in the excavator field to recognize this fact—to build a line of machines which give you the extra advantages of speed, toughness and dependable low-cost performance which these new steels make possible. Watch others follow P & H design. Harnischfeger Corporation, 4419 W. National Avenue, Milwaukee, Wisconsin.

17 DIFFERENT MODELS ranging from 3/8 to 5 cu. yds. capacity
7 attachment combinations.
Gasoline, Diesel or Electric Power.
Write for literature on the size and type you need.

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EXCAVATORS • ELECTRIC CRANES • ARC WELDERS P&H HOISTS • WELDING ELECTRODES • MOTORS

Reflector Button Signs

Fireball reflector buttons for use in highway traffic regulating signs and signals, manufactured by the National Colortype Co., Inc., Bellevue, Ky., are made in two types. The front-entrance buttons are placed in the sign face plate from the front and fastened in the back by means of a substantial reinforced clamping shell locked in position over the body shell of the unit. The nut provided is screwed down over the stem of the body shell, holding the unit firm and in position.

Buttons of the rear-entrance type are dropped into punched holes in the sign, the rear housing placed in position and the two bolted together in the usual manner. The blade springs on the back of the body shell press against the rear housing, keeping the buttons tight against the sign plate and compensating for small differences between the sign plate and the rear housing. Both types of mounting are claimed to be pilferproof by the manufacturer.

The features of these reflector buttons and the various uses to which they may be put are described and illustrated in literature which interested state and county highway engineers may secure direct from the manufacturer.

Sodium-Vapor Lights in India

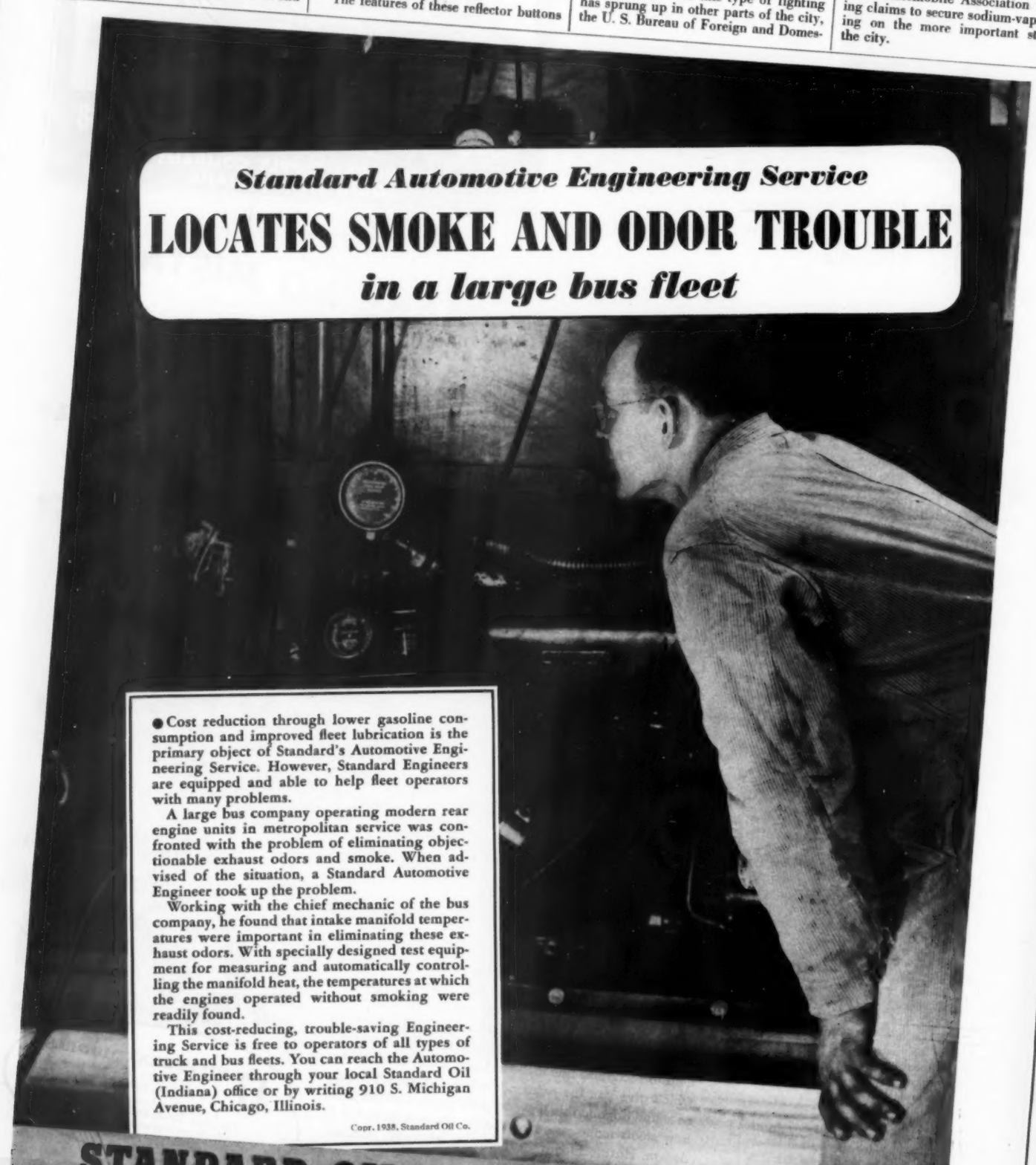
The sodium-vapor lighting experiment over a short section of a Bombay, India, suburban road has been so successful that a demand for this type of lighting has sprung up in other parts of the city, the U. S. Bureau of Foreign and Domestic Commerce reports. Although the question of extending the system has not been definitely settled, it has been pointed out that the consumption of current is so much less than the present system that the additional cost of the change-over plus maintenance makes this type of lighting economical as well as effective.

It is also reported that the Western India Automobile Association is pressing claims to secure sodium-vapor lighting on the more important streets in the city.

Standard Automotive Engineering Service

LOCATES SMOKE AND ODOR TROUBLE

in a large bus fleet



● Cost reduction through lower gasoline consumption and improved fleet lubrication is the primary object of Standard's Automotive Engineering Service. However, Standard Engineers are equipped and able to help fleet operators with many problems.

A large bus company operating modern rear engine units in metropolitan service was confronted with the problem of eliminating objectionable exhaust odors and smoke. When advised of the situation, a Standard Automotive Engineer took up the problem.

Working with the chief mechanic of the bus company, he found that intake manifold temperatures were important in eliminating these exhaust odors. With specially designed test equipment for measuring and automatically controlling the manifold heat, the temperatures at which the engines operated without smoking were readily found.

This cost-reducing, trouble-saving Engineering Service is free to operators of all types of truck and bus fleets. You can reach the Automotive Engineer through your local Standard Oil (Indiana) office or by writing 910 S. Michigan Avenue, Chicago, Illinois.

Copr. 1938, Standard Oil Co.

STANDARD OIL COMPANY (INDIANA)

AUTOMOTIVE ENGINEERING SERVICE LOWERS MILEAGE COSTS

Among the Manufacturers

The Baker Manufacturing Co., of Springfield, Ill., has announced the appointment of O. S. Brodnax as Representative for the Southern District. Mr. Brodnax, who is a native of Georgia, was formerly a sales representative of the B. F. Goodrich Co.

The Philip Carey Co., Lockland, Cincinnati, Ohio, has announced the appointment of V. V. Malcom as Manager of the Elastite Expansion Joint Department, Specialty Products Division. Mr. Malcom's duties will involve the sale and engineering of the company's Elastite, plate-dowel, non-extruding asphalt and rubber expansion joints and subgrade felt.

Davey Compressor Co., Kent, Ohio, recently announced that its sales for 1937 reached a peak 50 per cent in excess of those of any previous year. Four new representatives recently added to the staff are W. R. Clark, Mid-Western District Manager; Stuart G. Smith, Eastern District Manager; H. B. Owsley, Manager for North and South Carolina; and R. L. Garrett, Assistant Ohio Representative.

Federal Motor Truck Co., Detroit, Mich., has appointed Roy Evans, formerly District Manager for Dodge in the Chicago territory, as Assistant General Sales Manager in charge of the western territory.

The General Motors Sales Corp., Diesel Engine Division, Cleveland, Ohio, has appointed George T. Mahaney as Eastern Retail Sales Manager and James D. Platt, Western Retail Sales Manager, to cover the territory extending from Mobile, Ala., northward through Chicago and Milwaukee. Both these men will maintain offices at the headquarters of the new Diesel Division in Cleveland.

Jones & Laughlin Steel Corp., Pittsburgh, Pa., recently elected Lewis M. Parsons Vice President in charge of Sales and a Director of the company. Mr. Parsons, who until recently was connected with the sales division of the Bethlehem Steel Co., will have entire charge of all sales activities, including the district sales offices.

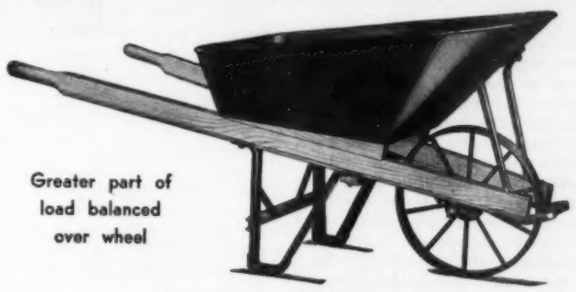
R. G. Le Tourneau, Inc., Peoria, Ill., and Stockton, Calif., has announced the promotion of Denn M. Burgess, formerly Eastern Sales Manager, to the position of Domestic Sales Manager. J. W. Le Tourneau, General Sales Manager since the founding of the company, now occupies the position of General Manager, an office newly created to permit his supervision and guidance over a much wider range of activity. Assisting Mr. Burgess are John R. Bryan, acting Western Sales Manager; Louis D. Le Tourneau, Central Sales Manager; and Gordon S. McKenty, Eastern Sales Manager. Jack Le Tourneau, formerly of the service department, is now District Representative in the Pacific Northwest and Howard Stilley, formerly Assistant Field Engineer, is now District Representative in the North Central States. Stanley D. Means continues as Federal Sales Manager.

Marmon-Herrington Co., Inc., Indianapolis, Ind., recently completed the arrangements for the establishment of factories at two places in Canada to manufacture all-wheel-drive vehicles. One factory, operating under the name of Truck Parts & Equipment, Ltd., will be established in Vancouver, British Columbia, to serve western Canada, and the other, Canadian Traction, Ltd., will be located in Montreal, Quebec, to serve the eastern section of Canada.

Owen Bucket Co., of Cleveland, Ohio, recently lost its President, William H. Botten, who died on March 27 after a month's illness at the age of 73.

Western Cataphote Corp., Toledo, Ohio, has appointed W. H. Meredith, widely known highway traffic engineer, as special traffic and reflecting sign engineer, to work with state and county highway departments throughout the country on safety problems connected with signs, markings, traffic signals, accident-prone locations and safety educational work. Mr. Meredith has been with the Missouri State Highway Department for the past 16 years, specializing as an engineer of marking in charge of statewide traffic work during the latter half of this period. He originated a mechanical method of determining safe speeds on curves which was used on U. S. 40 through Missouri last year with notable results.

STERLING BALANCED WHEELBARROWS



NO. S18 CONCRETE BARROW

A COMPLETE LINE OF STERLING WHEELBARROWS AND CONCRETE CARTS

STERLING WHEELBARROW CO., MILWAUKEE, WIS.

AMAZING PERFORMANCE

THE NEW "99" MOTOR GRADER DRIVES & STEERS ON all 4 Wheels

IN SAND • AROUND SHARP CURVES IN GUMBO • IN DEEP SNOW—
Wherever the Going Is Tough

Performance records demonstrate conclusively that the A-W "99" will outperform on any highway job . . . grading, ditching, oil mix, etc. Here's a typical example: On a southern road job . . . through "ball-bearing" sand where several different motor graders had failed . . . the No. 99 handled the entire mixing (sand with asphaltic oil) without faltering. The revolutionary features which enabled the A-W "99" to handle this job . . . which are making motor grader history in every section of the country . . . are:

ALL-WHEEL DRIVE: With every ounce of weight on a driving wheel, the "99" develops MORE TRACTION . . . puts more available power to work . . . Front wheels climb up and over to exert a powerful pull on the blade. *CONTROLLED TRACTION:* An exclusive feature whereby wheels and frames are offset to EFFECTIVELY NEUTRALIZE blade side draft. In this position a driving wheel tracks immediately in front of or behind each end of the blade to BALANCE the load. *ALL-WHEEL STEER:* Front and rear wheels can be steered separately or together—in the same or opposite directions . . . an extremely useful feature wherever the work area is restricted.

The design of the "99" eliminates frame twist. Blade never leaves floor of road, even on 30 degree curves. There is no gouging at the toe . . . no wasting at the heel. Blade can be shifted under the heaviest load without dipping or tilting at either end. Quick-acting hydraulic controls . . . precision built and perfected by Austin-Western . . . provide accurate adjustment under all conditions. Mail coupon for complete details.

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Aurora, Illinois

6 BASIC PERFORMANCE-IMPROVING FEATURES

. . . enable the A-W "99" to exceed all previous standards of Motor Grader capacity, stamina and economical operation.

1 ALL-WHEEL DRIVE 2 ALL-WHEEL STEER 3 CONTROLLED TRACTION
4 STABILIZED FRAME 5 PRECISION SIDE SHIFT 6 FULL HYDRAULIC CONTROLS

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1815 Barrows Street, Aurora, Illinois
Send me your new "99" Motor Grader Catalog No. 1710.
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Super-Highways

(*Continued from page 4*)

do so with the full realization that the venture is for the relief of unemployment rather than for the construction of a self-liquidating project. Better still, the Government should, in my opinion, appropriate as much money as is necessary to the Bureau of Public Roads so that the Bureau may make studies of locations where super-highways, toll free, should be constructed to relieve traffic conditions which are rapidly becoming unbearable. Surely the Government shouldn't embark on an $8,000,000,000 project without first spending a few million dollars to determine its soundness."

R. H. Baldock, State Highway Engineer, Oregon State Highway Commission, agrees with Mr. Brandt in questioning the economic justification of super-highways in many sections of the country and, in addition, protests against the toll charge. Mr. Baldock says:

"The proposal by Senator Bulkley for a system of super-highways should be carefully examined in the light of the economic data which will soon be at hand as a result of the state highway planning surveys now being carried on throughout the nation.

"While there is an apparent need for the improvement of arterial highways, interstate in character, and it is quite probable that failure to modernize such highways is handicapping commerce through inadequate transportation facilities, we should carefully consider the means to accomplish our objective.

"To most people the adoption of a toll system would mean retrogression. A special and direct toll charge for the use of certain highways would conflict with the present tax schedule of motor vehicles and cause a great deal of confusion. Obviously those using the toll road would demand relief from gasoline and ton-mile taxation. This feature would increase administrative expense and probably result in evasion.

"Any plan contemplating the building of multiple-lane arterial highways across the continent runs counter to the basic principles of highway economics. Traffic facilities should meet traffic needs, and wide two-lane highways will in all probability suffice for many miles of sparsely settled country. The proposed system would have to be heavily subsidized by the nation as a whole and the justification for such a subsidy is not apparent.

"Rather than such a pretentious scheme, a small additional tax on the road user and an increase in government participation representing a general community tax will probably yield the requisite road funds. This plan will not require any new administrative setup; rather the work can be handled, as at present, by the Bureau of Public Roads and the state highway commissions of the several states. This should bring about a realization of the needed highway facilities in an orderly, efficient and economical manner."

From the Safety Standpoint

The type of highway proposed by the Bulkley bill has much to be said for it from the point of the safe and expeditious handling of traffic. We asked Dr. Miller McClintock, Director of the Bureau of Street Traffic Research of Harvard University, to give us his opinion on the subject. Dr. McClintock says:

"The proposal of Senator Bulkley to construct, under Federal supervision and financing, a great national system of super-highways is by no means new. In principle, it goes back to the early Colonial proposal for a comprehensive system of post roads. It is at the present time, however, of some special significance in view of the traffic consideration involved.

"It is quite apparent that the operating characteristics of modern automotive traffic require the design of rather specialized types of trunk highways and that these trunk highways can serve the needs of our automotive transportation system best only if they are built in accordance with a logical national plan. In all probability, this of necessity implies a much broader type of Federal supervision and financing than has been the practice heretofore. Senator Buckley's proposal is directly in harmony with broad proposals made by many important national organizations.

"It has been the practice in this country to adhere to the principle of free roads and, unquestionably, it is an ideal which should be dropped only after very serious consideration. It is our own conclusion that the very superior types of traffic facilities proposed in principle by Senator Buckley would result in a very great 'induced traffic,' as this has always been the case where traffic facilities, logically planned, provide superior safety and freedom of movement. This increased traffic volume might, in itself, readily produce fuel tax and other automotive revenue which would defray a substantial part, if not all, of the cost of the plan. While tolls may be justified as an initial financing proposal, they should be used only with reluctance and then only to the degree which the added traffic volume fails to supply the necessary additional revenue."

The Highway User

Because ultimately the test of any road-building program is whether or not it meets the requirements and wins the approval of those who use it, we felt that no discussion of this proposed system of super-highways would be complete without hearing from the highway users. Speaking for them, Chester H. Gray, Director of the National Highway Users Conference, says:

"The toll super-highway plan contained in several measures, but mostly under discussion as presented in the bill by Senator Bulkley, is seemingly too enthusiastically presented by its proponents insofar as solving the unemployment problem is concerned. It must not be forgotten that the Federal government will be much more handicapped than are state governments in purchase and condemnation procedures in securing rights-of-way.

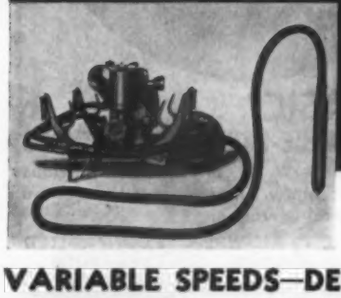
"It is well known that a principal difficulty and cause of delay in highway building by states is securing the right-of-way. The Federal government could not reasonably be expected to secure the wide and extended rights-of-way necessary for the toll super-highways quickly enough that the construction of these roads would be even an insignificant factor in stopping or curing the present depression.

"A second difficulty of this proposal in the minds of the public is that it reverts to the old toll-gate method of collecting fees for the privilege of using the highway. Two things, in the American plan of government, are free and should always be so—roads and schools. The highway user now pays, in addition to his general taxes, a large amount in imposts of various natures. If, in addition to his present transportation costs, the highway user should be required to pay a highway toll, one of three things would result, inevitably. First, he would not voluntarily use the super-highway; second, he might be forced by Federal regulations to use these highways for certain kinds of traffic; and third, in either event, the income from the toll super-highway would be but a fraction of the amounts expected.

"A final condition, which must be properly evaluated in deciding whether or not the nation now needs the criss-cross of transcontinental highways as proposed in pending measures, is the amount of traffic, both passenger and freight, which is really long distance or transcontinental in nature. Surveys disclose that a minor percentage of all traffic is long distance; and a still less percentage is transcontinental. Surveys also disclose that highway traffic mostly is a large accumulation of short trips; consequently, the natural thing to do is to provide service highways, express highways, multiple-lane highways, or dual highways in the areas where traffic and population densities really require such roads. These highways should be kept free and as a part of the regular Federal-state highway system.

(*Continued on next page*)

JACKSON HYDRAULIC
CONCRETE VIBRATORS
GRINDER
DRILL



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2¾" Standard vibrator head: 2¾"x20". Recommended for all general concrete placing—adjustable frequencies.

1¾" Special 1¾"x36". Vibrator head for thin or heavily reinforced sections—adjustable frequencies.

GRINDER

The grinder is easy to use—very efficient for surface rubbing of concrete. Five minutes required to change from the grinding wheel to boring attachment, using Jacobs 3-jaw chuck. Drills up to ½" diam. in metal or 1-1¾" in wood.

DRILL

In Jackson Hydraulic Vibrators you get the correct relationship of frequency and amplitude to size and weight for uniform consolidation of concrete designed for placement by vibration. Lubrication is no problem—all moving parts operate in the hydraulic medium—a high quality, light bodied oil. *Write today for more information.*

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HERCULES "TIRE PACK" Dump Body

Carries the SPARE TIRE UNDER THE BODY

Burglar Proof
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Compartment for Tools Flares Shovels

NOW PATENTS APPLIED FOR

8 - FT. BODIES CAN BE CARRIED ON SHORT WHEEL BASE TRUCKS-

Without a Tire Mounting Problem!

No longer does valuable pay-load space have to be sacrificed for satisfactory spare tire mounting. Hercules puts the spare under the body — out of the way saving approximately 11 inches between cab and body. Now 8 foot bodies replace 7 foot bodies with perfect load distribution. Available only with the Hercules Super Power 16-T "Center Lift" Hoist which is designed and built in conjunction with the body underframe.

Write for Literature HERCULES STEEL PRODUCTS CO.
GALION, OHIO, U. S. A.

Super-Highways

(Continued from preceding page)

"In time they will provide what is needed to accommodate highway traffic, where that traffic has actually demonstrated the need for these more expensive types of roads. It does not appear desirable to build toll super-highways flung across the country, both ways, in long mileages on which traffic would be light rather than heavy."

Conclusions

At first thought, the Bulkley bill seems to have one strong point in its favor and that is, instead of pouring out public money to provide employment on a vast number of projects, the practicability and usefulness of which are seriously doubted by all intelligent and practical people, it substitutes a program of building roads which have definite lasting value as well as providing the best known method of creating and stimulating employment.

The proposal, however, has two serious dangers. One is that, in the first flush of enthusiasm, we shall embark on such a tremendous project without first determining its economic soundness and without a careful study of traffic needs so that eventually we should find ourselves with a nation-wide system of super-highways far beyond the traffic needs in certain sections, with the result that the project will in no way prove self-liquidating. The second danger is that because we are building a system of transcontinental super-highways, the regular Federal-Aid appropriations for state highway work will be curtailed.

We can not afford to and we must not substitute such a "relief project" as this for our systematic road-building program being carried on through the state highway departments and for which our millions of motorists are paying regularly through gasoline and motor-vehicle taxes. The United States today has the finest highway system in the world, due to the intelligent and cooperative work of the state highway departments and the U. S. Bureau of Public Roads, and we believe that we can maintain this high standard of transportation facilities and provide for the safe and economical use of those facilities only by a continuation of that method of carrying on our highway program.

This Traffic Line Marker Can Paint Miles of Line in One Day

Traffic Lines Promote Safety on Highways

The desirability of traffic lines as a highway-safety measure has been pretty generally recognized by traffic safety experts. According to the National Safety Council, accidents happen much more frequently on highways where traffic lines are absent or badly blurred than on roads clearly marked.

One of the traffic markers designed for use by state and county highway departments in painting traffic lines over long stretches of highway is a truck-mounted unit consisting of a DeVilbiss air-compressor-type device, equipped with solvent-proof Thiokol hose through which paint flows down to an automatic spraying gun which lays the paint on the road. It is claimed that with this unit a crew of two men can put down miles of even white traffic lines in a single day.

Automatic Timelock For Asphalt Plants

A feature of the Farasey steam-operated automatic timelock for asphalt plants, made by the J. D. Farasey Mfg. Co., Cleveland, Ohio, is that it not only locks the various units required to be locked by regulations, but it also opens and closes these units, by steam power, at the specified time. These periods of time are fully adjustable to the requirements. The steam power is applied to the aggregate weigh hopper and asphalt bucket by steam cylinders which act much the same as the mixer-gate operating cylinders.

After the aggregate and asphalt have been measured out into their respective hoppers, the operator pulls the starting lever of the timelock. The weigh box opens and discharges the aggregate into the mixer. The timelock then automatically closes the aggregate weigh box, and keeps it closed under steam pressure. Then at the required time the asphalt bucket opens, discharges the asphalt to the mixer, and is closed automatically by the timelock. The wet mixing goes on the specified time after which the timelock opens the mixer gate and discharges the batch into a truck, and then closes the mixer gate again.

Complete information on this automatic timelock and its operation on an asphalt plant is contained in Bulletin No. 20, copies of which may be secured direct from the manufacturer.

LAYING BLACK TOP?

JAEGER PAVER has 10 ADVANTAGES:

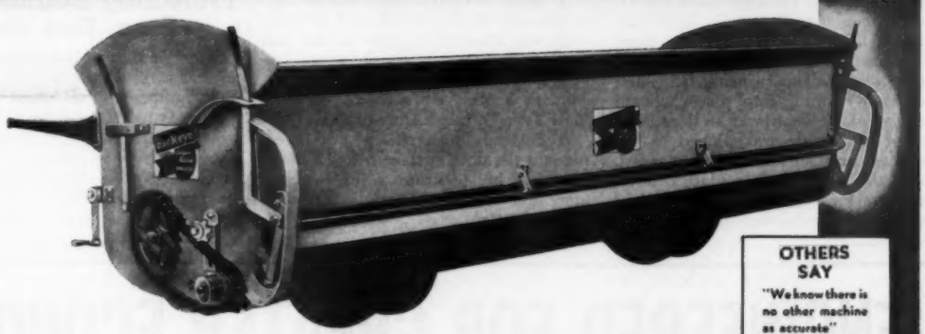
- 18 Ft. Movable Forms Give Smoothness of Concrete,
- 50% More Traction,
- No Load on New Material,
- Adjustable 9 to 14 Ft. Widths,
- Blends Perfect Joints,
- Capacity to 1000 Tons a Day,
- Lays Hot or Cold Bituminous, Stone or Macadam,
- Pug Mill Spreader,
- Less Hand Finishing,
- Automotive Construction,

Write for New Catalog, Prices.

THE JAEGER MACHINE CO.
701 Dublin Ave., Columbus, Ohio

JAEGER

"AFTER YEARS OF SEARCH Buckeye IS THE ANSWER"



THIS is exactly what a Building Material Company in California wrote to us—and we have similar reports from everywhere in the United States—contractors . . . supply dealers . . . highway departments . . . engineers. States, counties, cities and townships report—"Satisfied"

OTHERS SAY

"We know there is no other machine as accurate"

"The Buckeye is the only spreader I have ever seen that can be controlled perfectly"

"Accurate to the pound per square yard"

"It is the best spreader I have ever seen in more ways than one"

"It absolutely wastes no stone or slag"

"Accuracy—time saved—but most important—it satisfies engineers"

QUOTED STATEMENTS are authentic — we retain in our files the original reports received from users for record and proof of quotations used in our advertising.

Buckeye Surface Material SPREADER

BID THE Buckeye WAY
ask for our operation data before you bid

The BUCKEYE TRACTION DITCHER COMPANY
• FINDLAY, OHIO •

THE BUCKEYE TRACTION DITCHER CO. Findlay, Ohio
Send at once literature and data on your 1938 Surface Material Spreader.

Name _____

Address _____

City _____ State _____

Attaching a Suspended Stringer to a Cantilever Stringer by Means of a Toggle on the Necarney Bridge

Steel Span Built On Oregon Highway

(*Continued from page 2*)

to consideration the number of piers and the deck fabrication, a cheaper and at the same time satisfactory construction is possible.

From the contractor's standpoint, too, it is simpler to erect than the regulation type.

Placing Steel

On the Necarney Bridge, the four parallel 36-inch x 150-pound stringers consist of 42-foot lengths of stringers cantilevered over the tops of the towers, projecting about 10 feet on each side, between the ends of which are hung 50-foot suspended stringers by means of heavy toggles. The suspended member was readily swung into place between the ends of the cantilever sections. One end of the toggle was pinned to the cantilever member and hung suspended. To get the lower pin into place readily, the contractor made a pilot nut, required by the specifications during erection, for the threaded pin. This was slightly tapered at one end and had an internal thread at the other which fit the thread on the connecting pin. When the pilot nut was screwed on, its taper permitted the pin to be driven through the holes easily. Then the pilot was unscrewed and removed and the regular nut screwed into place.

The problem of erection from the standpoint of curvature was also simplified, this bridge being on a 10-degree curve. It was necessary only to make the cantilever and suspended stringers successively shorter by the necessary amount, from the outside toward the inside of the curve. When the suspended members were hung, the whole superstructure fell into line on the proper curve as easily as it would have lined up in the construction of a bridge on a tangent.

When the stringers were in place they were stiffened by transverse diaphragms consisting of 36-inch x 5/8-inch plates. These make all the stringers act as a unit in carrying the live load.

Pouring Concrete Slab

The contractor also found that he could simplify the procedure of concreting the deck, which is a 7½-inch slab of concrete with reinforcing of ¾-inch round steel. The suspended sections between the towers were poured first, and the dead load represented by the concrete produced approximately the maximum amount of end deflection and upward curvature in the cantilever members. Allowance was made for all deflections, in the construction of the forms and setting of the streets so that, after pouring, the deck surface would be at proper grade.

A Jaeger two-sack mixer was located at one end of the bridge and the concrete was wheeled to place in one and two-man pneumatic-tired buggies. Immediately upon dumping, it was vibrated with a Mall vibrator, driven by a Mall Type G. C. gasoline engine.

A delayed finish method was used, planing the deck surface 6 to 12 hours after pouring to insure a finish of not more than 0.07-inch deviation from a 10-foot straight-edge.

The Galion Model GH-58 Hydraulic Hoist

New Hydraulic Hoist For Dump Trucks

A feature of the new Galion Model GH-58 hydraulic hoists, recently announced by the Galion Allsteel Body Co., Galion, Ohio, is the heavy-duty roller-bearing pump which is not only powerful but fast operating, developing hoist-dumping speeds of from 13 to 18 seconds. This vertical pump, which is equipped with bronze wearing plates, is connected to the cylinder by means of flexible hose.

The Model GH-58 has an oversize 8-inch cylinder which is ground and honed, and patented equalizing lift arms, insuring low and uniform oil pressures. It is rated for payload capacities ranging from 9 to 12½ tons.

Complete information on this new hoist may be secured by those interested direct from the manufacturer by mentioning this magazine.

Protecting Engines From Dirt and Dust

The Donaldson oil-washed air-cleaner, made by the Donaldson Co., Inc., 666 Pelham St., St. Paul, Minn., is available for all types of gasoline and diesel engines in use in tractors, trucks, power shovels, air compressors and other construction equipment subjected to dusty operating conditions.

This unit has three primary parts, an air stack and base, a body with a center tube inlet and screen element, and a removable oil cup with oil level bead and inner cup. When the cleaner is in operation, the dust-laden air enters through the center air inlet which is submerged below the oil level. As the air enters, the oil is forced upward into the screen element which separates the oil from the air and returns it to the oil reservoir. The sudden reversal of the air-flow direction removes a large portion of the dust which is thrown to the bottom of the cup. Only a portion of the oil is carried into the screen element and all of the cleaning is done in the oil cup and lower screens, so that the upper screens remain clean.

The action of the air upon entering the screens is to travel toward the outside of the cleaner, automatically washing the screens. It is not necessary to clean the screen element of the Donaldson oil-washed air cleaner as it can not clog, according to the manufacturer.

Complete information on this air cleaner and instructions for its installation are contained in literature which may be secured direct from the manufacturer by mentioning this magazine.

New Free Catalogs On A-C Equipment

Three new catalogs, describing and illustrating Allis-Chalmers tractors, road machinery and power units, have just been issued by the Allis-Chalmers Mfg. Co., Tractor Division, Milwaukee, Wis. A 36-page catalog is devoted to the Model S-O controlled ignition oil tractors, a 24-page booklet describes A-C gasoline, kerosene and natural gas engines and power units, and a 40-page catalog describes and depicts Allis-Chalmers tractors, graders, Speed Aces, and power units in use in construction.

Copies of these catalogs may be secured without obligation direct from the manufacturer.

Be sure your Congressman knows you wish him to vote for the new Cartwright Bill (HR 10,140) for Federal Aid for 1940 and 1941.

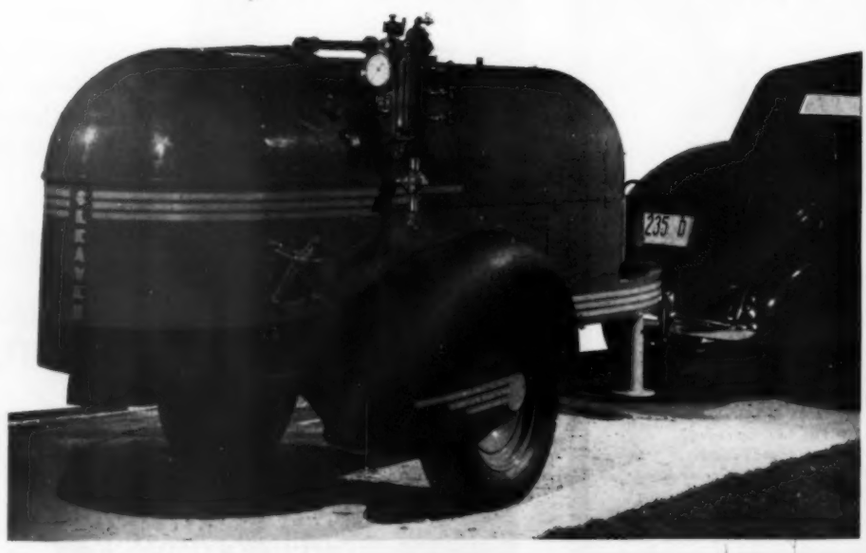
ENGINEERED FOR GREATER ECONOMY . . .

Styled FOR TODAY

This new Cleaver Tank Car Heater with its proven four pass, down-draft construction—its integral oil burner, its insulated body, its rugged frame, its novel trapless condensate system offers outstanding advantages to the contractor.

Trapless return of all condensation at very high temperatures avoids water-banked or air-bound coil systems, and eliminates the water wagon nuisance.

You will want to learn how this new design can save you money.



CLEAVER-BROOKS COMPANY, MILWAUKEE, WIS.

The New Emsco Wheeled Scraper

New Wheeled Scraper Announced by Emsco

One of the new pieces of equipment exhibited at the 1938 A.R.B.A. Road Show in Cleveland was the new Emsco wagon scraper recently announced by the Tractor Equipment Division, Emsco Derrick & Equipment Co., 332 So. Michigan Avenue, Chicago, Ill. Made in three sizes, small, medium and large, this new wheeled scraper is claimed by the manufacturer to have a number of new and interesting features.

Although light in weight in comparison with its capacity, the Emsco scraper has a stable, rigid construction. The wheels are so placed as to avoid obstructing dumping or digging operations. Special sheaves are used, so designed that it is almost impossible for dirt to get into them and they are made oversize to lessen cable wear. A double-drum power unit operates the scraper and a four-drum control unit will soon be available, permitting these scrapers to be operated in tandem. The entire unit has a low center of gravity, permitting operation on banks and steep grades.

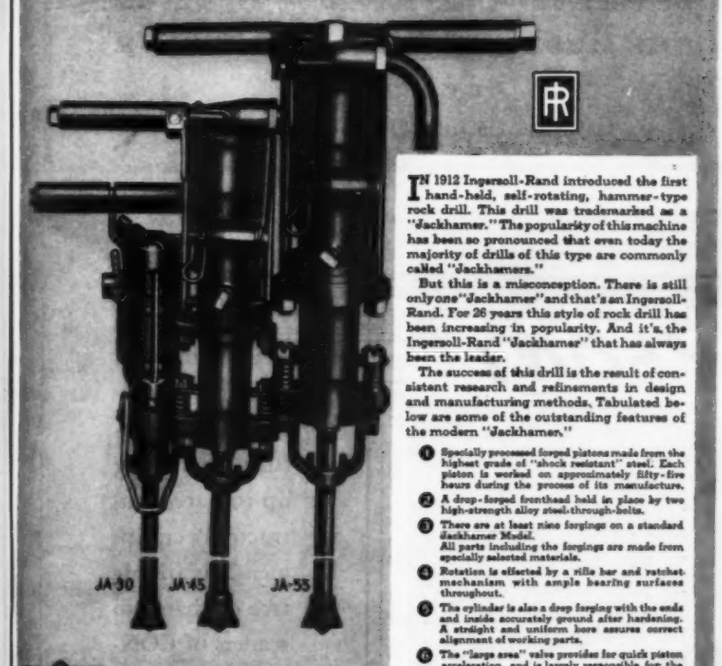
Complete information on these Emsco scrapers, as well as on the Emsco line of road rippers, bulldozers and graders, may be secured from the manufacturer.

Some Improvements In Mud-Jack Unit

Among the many pieces of standard equipment displayed at the 1938 Road Show in which small but important improvements have been made is the Mud-Jack of the Koehring Co., 3026 W. Concordia Ave., Milwaukee, Wis. The two cylinder heads of the Mud-Jack now pump through one valve which is self-cleaning due to reversing the flow each cycle so that any grass or sticky clay is immediately removed from the valve. A 3-inch solid steel ball acts as a check and permits practically a continuous flow of material through the valve from the two cylinder heads. A special new plug valve at the end of the machine permits attaching two hose lines which increases the yardage which can be handled by the machine by about 60 per cent. The pump cannot pump to two holes at once because of unequal pressure, but the quick change from one hose to the other, possible with this valve in which roots cannot become caught, is the reason for this improved output.

The pump capacity has been increased by eliminating the skirt on the piston. This reduces wear on the cylinder in sandy material. The piston valve is still the same and is mounted on the piston rod so that the valve is cleared at each stroke. Other improvements in the machine tend toward greater safety and convenience of operation by better housing and general streamlined appearance.

If it's a "JACKHAMER" IT'S AN INGERSOLL-RAND



IN 1912 Ingersoll-Rand introduced the first hand-held, self-rotating, hammer-type rock drill. This drill was trademarked as a "Jackhamer." The popularity of this machine has been so pronounced that even today the majority of drills of this type are commonly called "Jackhamers."

But this is a misconception. There is still only one "Jackhamer" and that's an Ingersoll-Rand. For 26 years this style of rock drill has been increasing in popularity. And it's, the Ingersoll-Rand "Jackhamer" that has always been the leader.

The success of this drill is the result of consistent research and refinements in design and manufacturing methods. Tabulated below are some of the outstanding features of the modern "Jackhamer."

1. Spatially processed forged pistons made from the highest grade of "shock resistant" steel. Each piston is worked on approximately fifty-five hours during the process of its manufacture.
2. A drop-forged fronthead held in place by two high-strength alloy steel through-bolts.
3. There are at least nine forgings on a standard Jackhamer Model.
   All parts including the forgings are made from specially selected materials.
4. Rotation is effected by a rifle bar and ratchet mechanism with ample bearing surfaces throughout.
5. The cylinder is also a drop forging with the ends and inside accurately ground after hardening. A straight and uniform bore assures correct alignment of working parts.
6. The "large area" valve provides for quick piston acceleration, and is largely responsible for the fast drilling speed and low air consumption.
7. Continuous flow lubrication is supplied to all working parts from the extra large oil chamber in the cylinder front washer or backhead according to the model.

Other I-R Products for Mines, Quarries and Contractors, include: all types and sizes of Rock Drills, Jackbits, Sharpeners, Compressors, Pneumatic Tools, Hoists, Pumps and Engines.

Ingersoll-Rand
11 BROADWAY, NEW YORK CITY

Butte Denver
Birmingham Detroit
Duluth
El Paso
Hartford
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Knoxville
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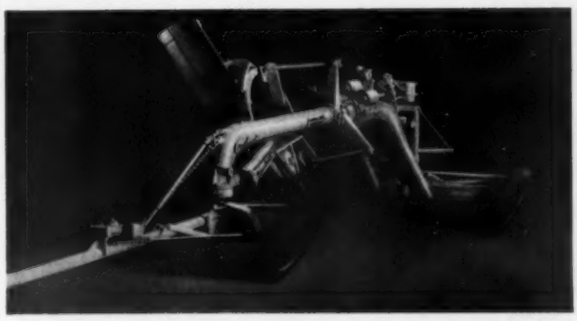
Start THE 1938 GRADING SEASON WITH WARCO EQUIPMENT

★ FLEXIBLE



A heavy duty Blade Grader, completely power controlled, with maximum strength, Visibility, and Range of Blade, wheel and axle movements.

★ VARIABLE

Quick and easy transportation from job to job, as well as conventional speeds and compression while rolling.

★ VERSATILE

WARCO Streamline Power Controlled Heavy Duty Model 33 or 35, powered with either Diesel or Gas, will solve your Motor Grader problem.

★ POWERFUL

WARCO reliable Heavy Model H Center Control, for the extensive construction job, has enabled many contractors to cut their costs.

W. A. RIDDELL CORPORATION
PIONEER BUILDERS OF ONE MAN GRADERS
GENERAL OFFICE & FACTORY BUCYRUS, OHIO

Stabilizing Road Base by Sub-Oiling

(Continued from page 29)

material to a sufficient degree to furnish a strong base for the light armor coat which has been applied. The description of the armor coat follows, except for the cotton fabric reinforced sections which will be described in a later article.

Armor-Coat Surface

The surface treatment of this stabilized base consisted of the application of bituminous material and pea gravel after reblading the surface of the base. About ½ gallon of water was applied to the surface when and where needed to bond the surface and then it was re-rolled. The water eliminated the dusty condition of the road in the absence of rain, but not enough was added to soak the edges of the base. When the top was tight and the surface dry MC-2 was applied, at the rate of 0.22 gallon per square yard to a width of 22 feet, with an 850-gallon Etnyre distributor using an 11-foot spray bar. One carload of TC-2 was used instead of the MC-2 at the south end of the work. Traffic was permitted to use the highway at all times so that only one-half was treated at a time.

When the prime had cured for from one to fourteen days with traffic using it after the first few hours, the breaks in the prime were repaired by reshooting with a hand spray. Very little of this treatment was necessary and what was done was caused by iron-tired vehicles traveling on the road too soon.

Without cleaning the prime a lower tack coat of RC-4 was applied 20 feet wide at the rate of 0.35 gallon per square yard and immediately covered with pea gravel at the rate of 27 to 30 pounds per square yard, using a Buckeye spreader box 10 feet wide and backing the trucks onto the tack coat. In such places where the pea gravel seemed thin it was hand-spotted with 3 to 5 pounds per square yard additional. After about six hours a drag broom was pulled over the pea gravel. The broom consisted of a 10-foot straight broom at the front and a similar one at an angle leading from the end of the first and so arranged that it pulled gravel onto the road instead of brooming it onto the shoulder. Wire brooms were used for this purpose. The broom was followed by the 5-ton flat roller further to key the gravel to the tack coat. A few days later a Hough power broom and a drag broom in tandem were used to move the gravel which had been whipped to the shoulder back onto the surface. This completed the armor coat which is about one-stone thick.

Personnel

This 20.116-mile stabilization project was awarded to the Midwest Precote Co. of Kansas City, Mo., on its bid of $144,343.31. The work was done under the direction of the Missouri State Highway Department with the cooperation of the U. S. Bureau of Public Roads. For the State Highway Department, Abner Gwinn was Project Engineer, and for the contractor, T. H. Cutler, Jr., was Superintendent.

Heavy-Duty Trailers

Hanson goose-neck heavy-duty hauling trailers, made by the Hanson Excavator Works, Tiffin, Ohio, are fabricated by a combination of riveting and welding to provide strength and ruggedness for the trailer frame. Carbon steel beams extend the full length of the frame, supported by cross members and gusset plates which brace the frame and help distribute the load evenly.

A goose-neck, securely riveted and welded to the main frame, is so designed that the front-axle mounting can make a full right-angle turn, thereby enabling the trailer to make a complete turn in its own length. Two large-diameter Timken taper roller bearings with provisions for adjustment assure ease of turning under full load. The brakes, which are fully enclosed, are of the self-adjusting internal expanding type, having two shoes with a large braking area. They are controlled through a worm and worm wheel reduction with hand-wheel control at the front above the goose neck. All operating parts are provided with Alemite Zerk lubrication fittings conveniently located. Standard equipment includes safety chains, three lashing loops on each side of the platform, and loading skids.

Hanson trailers, which are available in capacities of 6, 8, 10, 12, 15, 20, 25, 30 and 40 tons, are described in literature which may be secured direct from the manufacturer.

The Mall Gas-Engine Chain-Link Saw

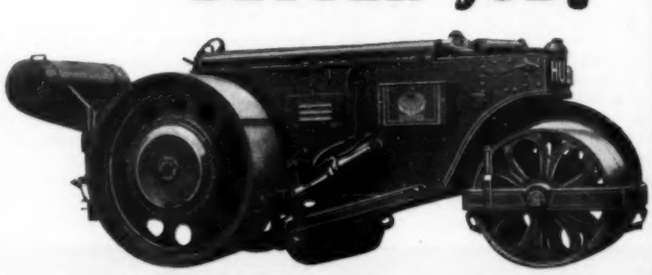
New Chain-Link Saw With Gas-Engine Drive

A new design of light-weight portable chain-link saw, operated directly from a gasoline engine, has been developed by the Mall Tool Co., 7743 So. Chicago Ave., Chicago, Ill. This saw, which comes in two sizes with cutting capacities of 24 and 36 inches respectively, is driven directly from either a 3 or 5-hp single-cylinder 4-cycle air-cooled gasoline engine by means of flexible shafting. The engine and shaft are mounted on a welded tubular frame, which is equipped with a 20-inch pneumatic-rubber-tired wheel so that the entire unit can be handled like a wheelbarrow. The engine is mounted on a swivel base and can be revolved to 360 degrees, making it unnecessary to move the equipment for different cuts.

Standard ⅝-inch flexible shafting in 7-foot lengths is used to give a working radius up to 28 feet. The saw clutch, attached to the saw housing, is a special oil-disc type. The spindle, which runs in ball bearings and has a speed of 3,600 rpm, has heat-treated spiral-cut bevel gears with a ratio of 12 to 40. The spindle housing is of aluminum to minimize weight.

The saw teeth are of forged steel, electrically heat-treated and hardened, and very easily replaced. The weight of the 24-inch saw is 46 pounds and that of the 36-inch size is 58 pounds, both including the clutch.

Built To Do A BETTER JOB!



Sturdy construction combined with many modern and exclusive features of design account for Huber's lower operating costs—lower maintenance—plus the extra speed which enables it to do a better job in less time. Huber Road Rollers invite comparison. Buy by comparison—and you will buy a Huber.

Write for Bulletins describing these modern machines in detail.

THE HUBER MFG. CO., MARION, OHIO

Buy a Huber

6 Sizes—5 to 12-Ton—Gas or Diesel

TAKE THE RIGHT SLANT ON YOUR ROAD PATCHING . . .

Check up your patching crew. Be sure they have the right tools to do a good job. Are they using old worn out heating kettles, or slow hand pouring pots? Show results with quick-heating Littleford No. 84-HD "Double Heat Circulation" Oil Burning Kettles, equipped with the Hand Spray Attachment.

Trail this kettle behind your truck, with two men to cover the freshly coated patches. Your same patching crew can take care of a bigger mileage of streets and road surfaces—perhaps streets you were never able to reach before. For repairing ragged edges of road shoulders and for widening curves, this No. 84-HD kettle with hand spray is a good investment.

Write for Bulletin M-1 giving complete details.

LITTLEFORD

LITTLEFORD BROS.
485 EAST PEARL STREET
CINCINNATI, OHIO

TURN to pages 46 and 47 for interesting literature regarding up-to-date contractors' equipment, available free of charge to readers of CONTRACTORS AND ENGINEERS MONTHLY.

A Big Roman 16-28 Disc Plowing Harrow Mixing Rock with Road Base Preparatory to Black-Topping

Road-Mix Construction With a Disc Harrow

In several of the southern states where road-mix construction has been under way for several years, and now in southwestern states, the disc harrow has come to be recognized as one of the best tools to initiate the mixing operation of the stabilizing agent and the aggregate, whether it be a bituminous binder, clay or some other material which may be used as the stabilizing agent. The Rome Plow Co., Cedartown, Ga., has developed the Big Roman series of disc harrows, which have been used effectively in road-mix service.

The largest of this series is the Big Roman which is a combination harrow and plow for use behind the largest tractors. It has a high-clearance frame with no low parts in front of or behind the disc, and the rear section trails accurately behind the front section at all times. The tractor hitch is built of cast steel and is full revolving and swivel-mounted. The rear coupling device is interchangeable with the tractor hitch. Angling devices keep the discs in line.

The disc gangs may be angled through the use of tractor power by means of an automatic latch, handled from the driver's seat. They may be locked at any desired angle. The disc has chromium hardened metal bearings in each disc spacing, braced to the gang frame with high-carbon-steel standards and the discs themselves are made of extra-heavy specially-heat-treated steel.

The net weight of these disc harrows, equipped with 26-inch discs using from 6 to 12 per gang, varies from 1,700 to 4,100 pounds, and cuts a swath from 6 to 12 feet wide. Using 28-inch discs, the weights in the same category run from 1,800 to 4,200 pounds for single sections. The double sections are approximately twice as heavy.

Segmental Functions

A new publication entitled "Segmental Functions, Text and Tables" by C. K. Smoley, author of "Parallel Tables of Logarithms and Squares and of Slopes and Rises" has just been announced. The purpose of this new book is to facilitate calculations involving circular work, which has been achieved by creating a new mathematical entity, the segmental functions, which accomplish for the solution of the circular segment what the trigonometric functions have done for the solution of the triangle.

Copies of this 430-page book may be secured from C. K. Smoley & Sons, Scranton, Pa. Price: $5.00.

Make Idle Hours PAY!

Slack periods between your larger jobs become a source of profit with a MICHIGAN TRUCK SHOVEL-CRANE. The truck-mobility and economy of the MICHIGAN, plus its quick-change to DRAGLINE, CLAM or TRENCH HOE, enables you to take *profitable* advantage of several "in-between" jobs at a time. . . . And the MICHIGAN is always ready for steady work as well, where its high operating speed means *real production.*

Get the complete facts on the versatile ½ yd. and ⅜ yd. MICHIGAN TRUCK SHOVEL-CRANE.

"WRITE FOR BULLETIN C"

MICHIGAN POWER SHOVEL CO. BENTON HARBOR, MICHIGAN, U.S.A.

New ease and precision of control allows this grader to make a bank cut position in excess of 80 degrees.

Extreme adjustments for deep ditch cuts are possible with Galion graders. Also maximum vertical blade angle for bank cutting.

GALION

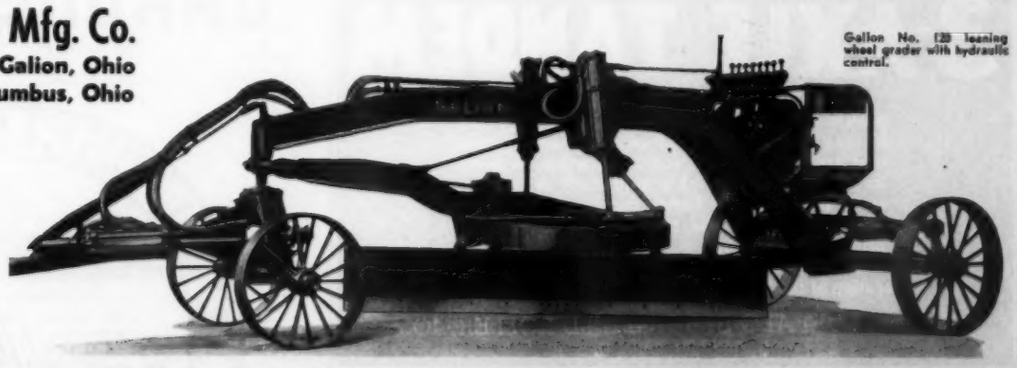
With the speedy adjustments available on Galion leaning wheel graders it is possible to do many different jobs and different types of cuts in rapid succession. The various positions are taken in stride because a single dash lever controls the locking and releasing of both the front and rear circles.

It is possible to change from a deep ditch-cut setting to a high lift bank-cut position in excess of 80 degrees with the horizontal, in less than three minutes without operator leaving platform. Blade can be set to cut a 12-inch flat bottom in a ditch, extreme right or left for shoulder cuts, distributing material on new fills, etc.

These and other features of Galion leaning wheel graders are explained fully in Bulletin No. 221. Send for your copy.

The Galion Iron Works & Mfg. Co.

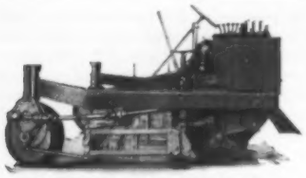
Main Office and Works — Galion, Ohio
Export Division — Columbus, Ohio



Galion No. 125 leaning wheel grader with hydraulic control.

GALION ROAD MACHINERY

Motor graders Rollers
Maintainers Sanders
Scrapers Rooters Spreaders Drags Blades



The New Adnun Black Top Paver

Improved Features Of Black-Top Paver

The outstanding change in the 1938 model of the Adnun Black Top paver, made by the Foote Co., Inc., Nunda, N. Y., is the replacement of the manual controls on the screed, the power cut-off and end gates by hydraulic controls.

Another feature is that the power cut-off gate at the bottom of the hopper is now divided into four sections, each section independently and hydraulically controlled by a small lever on the operating platform. This permits the opening of any section of the power cut-off to permit black-top material to feed to the grade without opening any other section. Thus, the operator is in position to control shouldering or laying sections between car tracks virtually while the machine is in motion. The screed or cutter bar can be raised at either end or both ends for super-elevated curves or crowning. The end gates can be raised or lowered to feed materials to either side. Better material distribution is accomplished by removable worms to feed the materials to the ends of the hopper.

Hydraulic control action is smooth and easy and permits the operator of the machine to give more attention to the actual building of the road. It also reduces day-end fatigue which often results from handling the many levers on a machine of this type.

New 1-Ton Ford Truck

A new One Tonner features the 1938 expanded line of Ford V-8 trucks announced by the Ford Motor Co., Dearborn, Mich. Intended for wide use in the 1-ton field, the unit is available in several body types. A new wheelbase length, the 134-inch chassis, replaces the 131½-inch wheelbase of previous years. This chassis has greater load space forward of the rear axle and its frame dimensions permit easier mounting of standard and special bodies. As in past years, the 157-inch wheelbase chassis is available with stake and platform bodies and as a chassis with cab.

The new One Tonner with a wheelbase of 122 inches is especially designed to permit wider use of the 60-hp V-8 engine in truck operations. Heavier gage steel is used on the 112-inch pick-up body. The flare boards and tail-gate also have new rolled-edge reinforcements. The floor load is carried on angle framing riveted to body sides. The body sills rest on the X-members as well as on the side frame members. The corner posts are round for greater rigidity. The load length of pick-up has been increased to 77¾ inches and the height of the flare boards to 20¼ inches.

The braking action on the trucks has been improved through the use of larger brakes and self-energizing brake shoes with cable and conduit control. Quicker stopping is obtained with much less pedal pressure. Drum diameters have been increased to 15⅛ inches and the drums are heavily ribbed for added strength and quicker cooling.

The reception accorded the 60-hp V-8 engine has insured its continuance in parallel with the popular 85-hp V-8 engine. Truck steering has been made easier through the use of a new worm and roller-type steering gear and larger steering wheel. The steering gear ratio has been increased to 18.2 to 1 and the wheel diameter to 18 inches.

Proved chassis features such as full torque tube and radius rod drive, full-floating rear axle, straddle-mounted driving pinion and centri-force clutch on trucks, and three-quarter-floating rear axle, straddle-mounted pinion, centri-force clutch, interleaf lubrication and oilless-type spring shackles on commercial cars are continued.

The 122-inch trucks have disc-type wheels with large rustless steel hub caps. The rims are full truck type and the tires are 7.00-17-inch 6-ply.

A New Portable Shear

A completely new portable Lectro-Shear, in 16 and 18-gage sizes, which will cut all types of sheet metal quickly, easily and accurately, has recently been announced by the Black & Decker Mfg. Co., Towson, Md. The shear will cut on a radius as small as ¾ inch and follows a straight or patterned line in steel, galvanized iron, monel metal and stainless steel as well as copper, tin, aluminum, lead and other non-ferrous metals.

The shearing action of the Lectro-Shear is accomplished by the rapid reciprocating action of a vertical blade against a stationary horizontal blade, set in a special shoe which indicates the correct cutting angle and adapts the tool to all kinds of cutting work. The unit is full ball bearing equipped, except the eccentric which is steel on phosphor-bronze, and is powered with a universal motor, operating on either alternating or direct current. Smooth streamlined aluminum housings eliminate obstructions and unnecessary weight.

This new Lectro-Shear is described in detail in literature which may be secured direct from the manufacturer.

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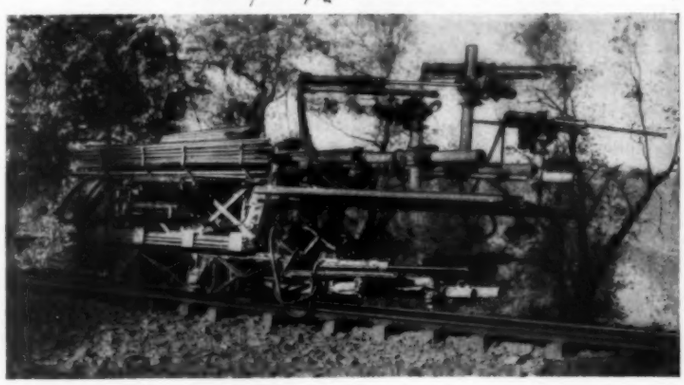
CHOSE
GARDNER-DENVER AUTOMATIC DRIFTERS
FOR THE STANISLAUS TUNNEL



Drill Carriage designed by Pacific Gas and Electric Company engineers to mount five AF-89 Gardner-Denver Drifters

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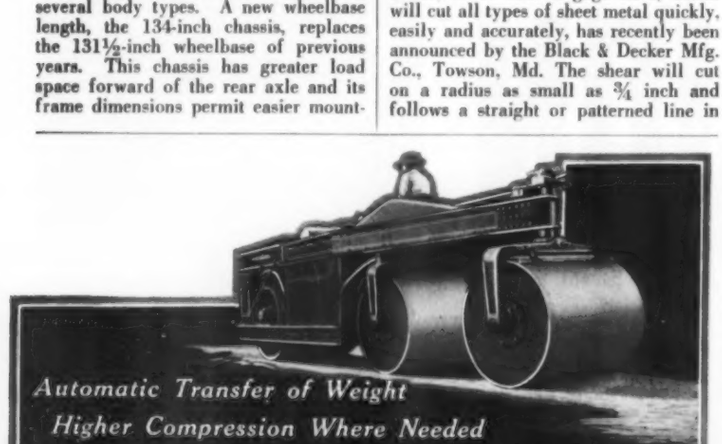

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Higher Compression Where Needed
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3-AXLE TANDEM

The Buffalo-Springfield 3-Axle Tandem accomplishes two phases of finishing work unequalled by any other roller: unprecedented smoothness and greatly increased volume of work. Its three large diameter rolls, all scientifically set on the same plane, deliver better density and greater smoothness while the material is receiving its primary compaction.

Full details regarding the advantages and operation of the 3-Axle Tandem will be sent upon request.

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HOTEL CHELSEA
Special Weekly Rates
From $6.00 With Meals & Bath
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Two in a Room Less Weekly

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Here you will find everything to further your comfort and enjoyment—outside ocean-view rooms . . . sun deck . . . beautiful dining room at the ocean's edge . . . superb cuisine . . . varied sports . . . and entertainment. You'll like your fellow guests, too, and the delightfully friendly atmosphere of The Chelsea.

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Write for Booklet & Information

The Master Vibrator with Wheelbarrow Mounting

High Speed Vibrator With Varied Mountings

Most concrete specifications now require vibration of the concrete to produce higher strength with a better bond between the concrete and steel or between successive layers and to lessen the reduction in shrinkage and cracking. The high-speed vibrators made by the Master Vibrator Co., 100 Davis Ave., Dayton, Ohio, are powered either with gas engines or with electric motors. The gas engine units furnish vibrating end speeds from 3,600 to 6,500 rpm. The electric motors are designed for constant speed at 7,200 rpm, single phase, 110-220 volts, 50 or 60-cycle current.

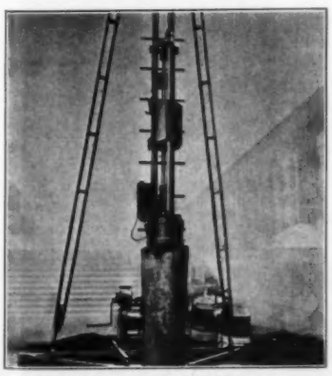
In addition to the wide variety of vibrating ends available, the Master vibrators are furnished in a 2-wheel buggy type for easy transportation, a pedestal type in which the vibrator is mounted in a pipe frame so that it may be swung from a crane or mounted on a small platform on high forms where specifications prohibit the vibrating unit being placed on the forms.

There is a pedestal type with a swivel base which permits the vibrator being turned readily and the base has holes so that it may be mounted on any standard wheelbarrow. The swivel base also has an attachment for a standard pipe-handle wheelbarrow with a pneumatic tire which is the easiest method of moving this unit. The electrically-operated vibrators are made in the pedestal or wheel type.

A New Diesel Pile Driver Drives Itself

A self-powered pile driver, which applies the diesel principle to a piece of construction equipment which has heretofore required an outside source of power, has been announced by the Calhoun Co., 1151 So. Broadway, Los Angeles, Calif. Known as the Delmag diesel pile driver, it is designed for driving light to medium piles and sheet piling and is available in two sizes of 660 and 1,000 pounds hammer weight.

The driving assembly of the pile driver consists of the hammer and base block which are connected by two guide rods. Projecting upward from the base block is a piston and contained in the hammer is a cylinder. When the hammer falls the piston compresses the air in the cylinder to about 440 pounds per square inch and at the same time fuel is injected. The resultant combustion throws the head upward and the cycle is completed when the head falls of its own weight. The number of blows can be regulated by a throttle over a range of 50 to 70 blows a minute, the length of stroke varying accordingly between 2½ and 5½ feet. The 660-pound hammer has a driving force of 3,630 pounds and the 1,000-pound hammer a driving force of 5,500 pounds.



The Delmag Diesel Pile Driver

The Delmag pile driver comes complete with a tripod support, ready to be set up on the job. Of comparatively light weight, it is readily portable. Usually only an operator and helper are required, although heavier piling sometimes requires an extra laborer. Fuel consumption figures have shown an average of only 5 quarts of diesel oil per 8 hours for the 660-pound pile driver, and 8 quarts per 8 hours for the 1,000-pound model.

This piece of equipment is one of a family of three self-powered units in the Delmag line, the other two being the Delmag Frog and the Delmag tamper and hammer. The two latter machines are novelties in this country, in that the combustion of gasoline within causes an upward and forward leap during tamping operations, resulting in a terrific impact when the machine falls to the ground.

Complete information on this Delmag line may be secured direct from the Calhoun Co., national distributor of this equipment, by mentioning CONTRACTORS AND ENGINEERS MONTHLY.

A New Spray Bar For Distributors

The Walker-Bar, a spray bar adaptable to any bituminous distributor, and made by the Earl Walker Co., Sullivan, Ill., is designed to give instantaneous spray, instantaneous shut-off and permit full circulation from end to end. It is sturdily built with Shielded-Arc welded construction, carefully designed for ample rigidity, yet with dead weight eliminated by the selective use of alloy steels. The bar has only one moving part, the sliding plate with a cut-off ball valve at each nozzle, fully enclosed in the line of heat to prevent gumming and sticking.

The control mechanism is a simple sliding bar, with no linkage to wear. Any section or combination of sections can be disconnected instantly merely by raising the control rod caps, and widths of from 4 to 20 feet thus secured. The hinged side bars are quickly raised or lowered, without the use of tools by the operator.

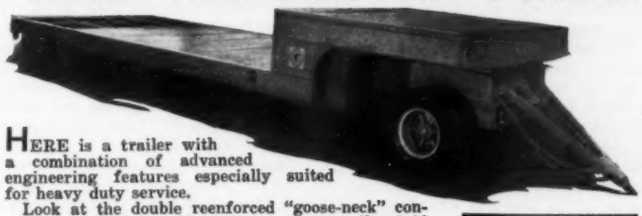
This Walker-Bar is described and illustrated in literature which interested contractors, state and county highway engineers may secure direct from the manufacturer by mentioning this magazine.

New Valve to Control Hydraulic Pressure

A new hydraulic-pressure control valve for use with brakes and clutches of heavy-duty machinery such as cranes, shovels, hoists, trucks, tractors and similar equipment, has recently been developed by the Morin Mfg. Co., Holyoke, Mass. The purpose of the valve is to provide a control device by means of which fluid pressure may be applied to a mechanism, as to one or more brakes, smoothly and gradually from zero to a desired maximum by as small increments of pressure increase as may be desired and by means of which pressure may be released in the same manner. Another object of the valve is to provide a control device which may be set in any one of various positions to provide for the application of any desired degree of pressure on the power-applying mechanism and which automatically maintains the pressure for which it is set.

Because of the special design of this valve, there is practically no opportunity for leakage of oil outside of the unit. Other features of the valve are its simplicity, its ability to control pressure accurately, and its reliability, according to the manufacturer. The valve has only two moving parts, the spring loaded piston and the pilot valve, both of which are floating and should give long uninterrupted service as there is nothing in the valve to get out of adjustment.

"JAHN" TRAILERS ARE BUILT TO TAKE IT!



HERE is a trailer with a combination of advanced engineering features especially suited for heavy duty service.

Look at the double reenforced "goose-neck" construction. This, combined with an unusually rigid "X" type frame, eliminates any possibility of frame sagging or kingpin failure. Recessed flooring protects ends of planking from splintering.

Equal load distribution is accomplished by multiple rear axles consisting of four oscillating type axles placed in dual tandem. Axles are designed and built with the problems of frame stresses definitely in mind and to assure the proper distribution of load and the elimination of frame distortion and frame failure.

If you're in the market for a heavy duty machinery trailer, don't fail to investigate the features these trailers offer. Write or wire—

This is only one of the many Jahn trailers. Jahn trailer designs include complete combinations of wheel arrangements for every type of load, from 5 to 100 ton capacities.

C. R. JAHN COMPANY, Builders Bldg., Chicago, Ill.

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WRITE TODAY for the new CMC equipment book. You will see the LATEST improvements in Concrete Mixers, Plaster Mixers, Pumps, Hoists, Saw Rigs, Barrows and Carts.

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Waterloo, Iowa

SAVE MONEY

ON DENTAL BILLS FOR DIPPER TEETH

Repairing dippers, building up worn teeth . . . these are but two of the many ways you can save money by doing your own repair and maintenance work on construction equipment.

P&H-HANSEN TRAILER WELDER

Hook it behind your car or truck—go anywhere at motor car speeds. With 150 ampere capacity you can handle a wide variety of welding jobs; repair work, building culverts, railings, erecting structural steel, etc. This moderate-priced unit is easy to use . . . pays for itself quickly in time and money saved.

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Pneumatic Vibrator Can Be Converted for Use as Hydraulic Unit

One of the features of the new Jackson pneumatic concrete vibrator, recently announced by the Electric Tamper & Equipment Co., Ludington, Mich., is its easy convertibility to a hydraulic unit if a contractor wishes to do so.

The new Jackson pneumatic unit is an internal-type vibrator primarily designed for puddling concrete in narrow or heavily reinforced sections. While the small diameter of 2¾ inches, low amplitude and high frequency of 8,500 rpm combine to make the Jackson pneumatic vibrator particularly adaptable to small jobs, the manufacturer claims that because of its powerful vibrations it is equally suitable for use on larger projects.

The unit consists of a pneumatic vibrator with an adjustable frequency range up to 8,500 rpm, submerged, at 80 to 85 pounds pressure; a pneumatic motor fitted with selected super-speed ball bearings; the whole enclosed in seamless rolled carbon steel with chrome nickel steel spade point, 2¾ inches in diameter and 21¼ inches long; oil-proof rubber and cord hose, consisting of 8 feet of flexible hose handle 1⅞ inches outside diameter with hand throttle, and 17 feet of single hose line, fittings and connections; and an automatic lubricator which is self-compensating for variations in pressure, automatically opening and closing as the vibrator is started and stopped to prevent loss of oil; and the lubricator assembly mounted in a cage unit to set on the ground or floor, and provided with brackets for hanging on forms, railings, etc.

If a contractor wishes to convert this vibrator to a hydraulic unit, all that is necessary is the hydraulic power unit and two lengths of pressure and return hose which are substituted for the pneumatic fittings. If, on the other hand, a contractor has one of the Jackson hydraulic vibrators and wishes to convert it into a pneumatic unit, he may do so by purchasing the exhaust fittings, hand throttle, lubricator and 17 feet of ⅞-inch intake hose. The lubricator and hand throttle can be attached to the intake branch of the hydraulic unit and the exhaust fitting to the return branch, thus converting the vibrator into a pneumatic unit.

New Self-Priming Pump Has 2,500-GPH Capacity

The new Barnes Model 2½M self-priming centrifugal pump, recently announced by the Barnes Mfg. Co., Mansfield, Ohio, has a 1-inch suction and 1-inch discharge and is powered with a Briggs & Stratton Model H ½-hp motor. It is 20 inches long, 15 inches wide, 16 inches high and weighs 70 pounds.

Five feet above water, this pump will handle 2,500 gallons per hour, 10 feet above water it will handle 2,000 gallons an hour, and 15 feet above water, 1,200 gallons an hour, at a total head of 40 feet. The priming time at 5 feet above water is 15 seconds, at 10 feet above water 60 seconds and at 15 feet above water, 120 seconds.

Complete information on this new pump may be secured direct from the manufacturer by mentioning this magazine.

New Highway Guard Rail

Sentry highway guard, made by the Laclede Steel Co., St. Louis, Mo., consists of flexible steel-plate rail panels, spring brackets and fastenings. The rail is spliced at each post by means of longitudinal splice bolts providing adjustment for variations in post spacing. Temperature springs on the splice bolts compensate for temperature expansion and contraction in each panel.

The rail is supported on spring brackets extending 6 inches in front of each post. These springs deflect under direct impact but furnish rigid resistance to longitudinal rail stresses. Special end anchorage is not required, but to resist the unbalanced rail stresses at the end post, due to temperature changes and impacts near the ends, the manufacturer recommends that the end panels be braced from the top of the end post to the bottom of the nearest intermediate post. This guard rail may be erected quickly and easily, requiring only the speed wrenches and spring bolt holder which are furnished with each shipment of Sentry guard rail.

Complete specifications and erection plans for Sentry highway guard may be secured by interested state and county highway engineers direct from the manufacturer by mentioning this magazine.

Road Congress at The Hague In June Will Stress Safety

Recent progress in road construction and traffic engineering and the interrelationship of these subjects are topics listed for discussion at the Eighth International Road Congress which will open on June 20 at The Hague, Holland. Problems to be considered by the Congress have been divided into two sections, one dealing with construction and maintenance and the other with use, administration and regulation. Both sections will merge for considerations of questions of mutual interest. Among the questions of safety will be a discussion of highway lighting and the degree to which such light is absorbed by different types of surfaces.

The Congress is sponsored by the Permanent International Association of Road Congresses with headquarters in Paris. In 1930 the United States was host to the Congress and in 1934 it was held in Munich. This year's session will open on June 20 with a ceremonial session. The following three days will be devoted to discussions after which the conclusions will be determined and announced at a plenary session on June 25. The ceremonial closing of the Congress will be Saturday, July 2.

The American Organizing Committee in Washington is in charge of the arrangements for U. S. delegates and further information may be secured from the Highway Education Board, Pan American Bldg., Washington, D. C.

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Light-weight, compact, patented "moving stencil" easily attached to any car or truck. Provides clean, straight center line, free from feather edge.

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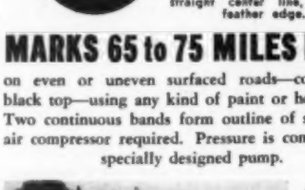
on even or uneven surfaced roads—concrete or black top—using any kind of paint or hot asphalt. Two continuous bands form outline of spray. No air compressor required. Pressure is controlled by specially designed pump.



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CURB AND CURB AND GUTTER FORMS

Simplicity of design has made Heltzel steel forms the most widely used unit in the construction industry. Developed to the highest degree of efficiency, one set of these modern universal forms will handle sidewalks, curbs, combined curb and gutter and integral curb and base projects without the usual outlay for special or additional fittings.

Illustration shows a combined curb and gutter unit with a double radius face rail. The division plates support the front and back forms to their full depth, the face rail is securely keyed to the division plates and the whole structure is locked in place by stakes of sufficient length to secure maximum stability. The face rails may be removed as soon as the concrete is set without disturbing the side forms, permitting curb and gutter construction with relatively few face rails.

Bulletin S-20-F illustrating the many varied uses of these universal forms will be mailed upon request. Write today for your copy.

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BINS, Portable and Stationary
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BATCHERS (for batch trucks or truck mixers with automatic dial or beam scale)
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FINISHING TOOLS FOR CONCRETE ROADS

HELTZEL STEEL FORM & IRON CO.
WARREN, OHIO, U.S.A.

Some Improvements in Bituminous Distributors

The Municipal Supply Co., South Bend, Ind., has had 30 years of experience in the manufacture of bituminous distributors. Its 1908 machine was horse-drawn and had gravity flow through three perforated bars. Its first truck-mounted pressure distributor was manufactured in 1915, and different applications were obtained by varying the truck speed and pressure, and heat was applied at the bottom of the tanks. In 1922 this company made the first distributor equipped with a separate engine for driving the pump, with a full-circulating spray bar having a valve at each nozzle.

The present South Bend distributor is equipped with an elliptical steel tank with 8-inch flues on the 800-gallon and larger tanks. It is carried on longitudinal sills with saddles of structural steel supported on the sills by box-type legs, and the tank is welded to each saddle. The heating system consists of two high-pressure generating-type burners, shielded from draft, located at the deep intake flue. The bituminous pump is a Viking self-draining rotary, having a 3-inch suction and 3-inch discharge, delivering 250 gpm, or a 4-inch suction delivering 375 gpm. The Viking rotary principle makes it possible to handle emulsions without breakdown. The pump is driven by a Hercules 4-cylinder 25½-bhp engine at 1,500 rpm, or a 37½-hp engine for the large pump.

The discharge system from the pump is directed to a central control valve operated by a lever at the rear of the distributor within easy reach of the operator. A special discharge attachment reverses the direction of the pump discharge from the spray bars and permits sucking back all material in the spray bars, eliminating dripping at the nozzle when material is shut off. The standard spray bars are 24 feet long in sections of two 4-foot, seven 2-foot and two 1-foot units with quick detachable couplings. Alternates include a 24-foot circulating spray bar with an individual valve at each nozzle. This bar is full-circulating for the entire length. Two Stewart-Warner tachometers are provided with the distributor, one operated from the truck transmission for indicating road speed, and one operated from the pump for indicating the pump speed. An alternate is a Stewart-Warner fifth-wheel tachometer indicating the truck speed and registering the number of feet traveled. A registering head for this tachometer is installed in the truck cab.

Additional equipment on this machine consists of a 15-foot 3-inch flexible metallic loading hose with a quick detachable coupling and 25 feet of 1¼-inch flexible metal hose complete with a spray arm, control valve and spray nozzle for hand spraying from the distributor when desired.

Vacuum Control for New Half-Yard Shovel

The Osgood Victor MV shovel, exhibited for the first time at the 1938 Road Show at Cleveland by the Osgood Co., Marion, Ohio, has a number of new features which give this heavy-duty machine more flexibility and less weight. A newly designed truck frame provides a more substantial mounting. Better control and a truck more resistent to the extreme service condition which a machine of this size is called upon to meet are found in this unit.

Another feature of the Victor MV is the Osgood vacuum control which has recently been improved. The control device as now used on the Osgood machines of the larger size gives the operator control over the swing motions of the machine without physical effort greater than would be required in opening or closing an ordinary door. The control device consists basically of opposed diaphragm valves, direct connected to a bell crank, which is actuated by the swing and travel clutch lever rod. The slightest movement of the swing and travel clutch lever acts on the bell crank and this in turn causes one or the other of the diaphragm valves to crack, permitting the vacuum in a large valve cylinder to change and actuates a piston arm direct-connected to the bell crank, setting the clutch bands. A vacuum-controlled brake on the swinging mechanism is operated by further movement of the one swing lever, allowing the machine to be accurately spotted or held at any desired point. The entire mechanism is very sensitive. The piston arm follows the movement of the clutch lever so closely that control of the clutch band is complete at all times.

A new bulletin fully describing and illustrating the improved vacuum control will be sent upon request.

THERE IS ROGERS HEAVY DUTY ONE FOR EVERY PURPOSE—

• Over 25 years of specialization and wide, general acceptance has produced a complete line of standardized trailers and large volume production.

Purchase of a Rogers Trailer therefore assures getting—a unit exactly fitted to your needs—practical design developed through long experience and the utmost value for your investment.

Check these statements for yourself in the Rogers Catalog.

ROGERS BROTHERS CORPORATION
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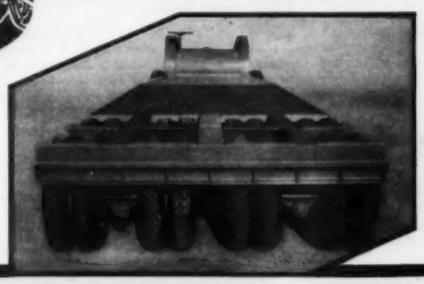

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2 to 8 FRONT TIRES
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5 to 75 TONS CAPACITY
4 to 16 REAR TIRES

GAR WOOD SCRAPERS

AVAILABLE IN 4 SIZES: 6—8—10—12 YDS.

COST *Less* TO OPERATE
. . . LESS TIME LOST
. . . MORE WORK DONE

A dual vehicle for a dual job—short wheelbase for hauling (see *illustration above*) and long wheelbase for long line of draft loading, (see *below*).

WEIGHT vs PAYLOAD IS ONLY 1 LB. SCRAPER PER 2 LBS. PAYLOAD!

• Check and consider these features: all high tensile alloy steel construction; positive double-acting, smooth power for all operations; spring lift mechanism giving quick lift with ZERO consumption of power while tractor is laboring; independent controls of each movement giving flexibility and adaptability in all types of materials.

WOOD HYDRAULIC

HYDRAULICALLY CONTROLLED
by perfected and job-proven Gar Wood hydraulic system

MOST STABLE SCRAPER ON THE MARKET
With lowest center of gravity and wide gauge rear wheels, it has the ability to do all jobs better and many jobs that are impossible to handle with a less stable scraper.

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Above: Note line of draft and compressed springs ready to lift.

ROAD MACHINERY DIVISION
GAR WOOD INDUSTRIES, INC., DETROIT, MICHIGAN
SCRAPERS • TRAIL BUILDERS • BULLDOZERS • RIPPERS • SNOW PLOWS • TAMPERS

Bulletins and Pamphlets

For free distribution to contractors, engineers and officials. Write for the catalogs you need.

New Bituminous Road Finisher

587 The new Barber-Greene tamping and leveling finisher for bituminous road construction is completely described and illustrated in a 4-page folder which the Barber-Greene Co., 485 W. Park Ave., Aurora, Ill., will be glad to send on request.

Asphalt for Pavements

588 Contractors and state and county highway engineers may secure complete information on the use of Texaco asphalt in road construction and maintenance from the Texas Co., Asphalt Sales Dept., 135 E. 42nd St., New York City.

Material-Handling Equipment

589 Porta Model 347 sectional conveyors which can be made up to suit individual requirements and as easily disassembled and transported to the next job are described in a catalog which the Portable Machinery Division, A. B. Farquhar Co., Ltd., York, Pa., will send on request.

For Road Building and Maintenance

590 The complete line of Burch road building and maintenance equipment, including chip spreaders, dump bodies and hoists, under-truck road maintainers, shoulder maintainers, conveyors and unloaders, and Ross snow plows, is described in literature which the Burch Corp., Crestline, Ohio, will be glad to send on request.

Wellpoint Systems

591 Contractors with wet jobs to be dried up may secure job estimates and literature on Complete wellpoint systems direct from the Complete Machinery & Equipment Co., Inc., Dept. C, 36-40 11th St., Long Island City, N. Y.

Construction Equipment Catalog

592 A big new illustrated catalog describing the complete line of CMC construction equipment, including mixers, hoists, concrete carts and pumps, may be secured without obligation from the Construction Machinery Co., Waterloo, Iowa.

Heavy-Duty Trailers

593 La Crosse Trailer & Equipment Co., Funk Bldg., La Crosse, Wis., will be glad to send to those interested complete information on its twelve different types of heavy-duty trailers in 5 to 200 tons capacities with four to sixteen wheels.

Auxiliary Transmission for Trucks

594 Watson-Brown-Lipe transmission, providing your motor trucks with additional speeds to meet all conditions of loads, roads and grades, is described in bulletins which the H. S. Watson Co., San Francisco, Calif., will be glad to send on request.

Controlled-Ignition Oil Tractors

595 A new 36-page booklet describing and illustrating the features of the Allis-Chalmers Model SO controlled-ignition oil tractor may be secured by interested contractors, state and county highway engineers direct from the Allis-Chalmers Mfg. Co., Tractor Division, Milwaukee, Wis.

Clear Roads in Winter

596 Information on Walter Snow Fighters with positive four-wheel-drive, designed for bucking snow drifts, may be secured by those interested from the Walter Motor Truck Co., 1001-19 Irving Ave., Ridgewood, Queens, L. I., N. Y.

Trailers for Heavy Hauls

597 Complete information on Fruehauf Carryall pneumatic-tired trailers for heavy-duty hauling requirements may be secured by those interested direct from the Fruehauf Trailer Co., 10928 Harper Ave., Detroit, Mich.

Oil-Engine Power

598 The features of Waukesha-Hesselman oil engines, which start on gasoline as easily as a gasoline engine and then go over to operation on diesel fuel, are described in Bulletin 1011 which the Waukesha Motor Co., Waukesha, Wis., will send on request.

Build Your Own Welder

599 A booklet "Building Your Own Arc Welder" describing how many contractors have assembled their own arc welders with a Hobart unit may be secured free from Hobart Bros., Box CE-28, Troy, Ohio.

Rock-Drilling Equipment

600 Bulletins 109 and 111, describing the Cleveland line of rock drills, drill rigs and similar equipment to meet all types of rock drilling requirements, may be secured by those interested direct from the Cleveland Rock Drill Co., 3734 E. 78th St., Cleveland, Ohio.

New Shovel Bulletin

601 The Browning Model ME unit, which is very easily adapted for shovel, crane, clam drag or hoe attachment, is described and illustrated in a bulletin also giving the working ranges of each of the attachments, copies of which may be secured on request direct from the Browning Crane & Shovel Co., 16226 Waterloo Road, Cleveland, Ohio.

Diesel Engine Curves and Ratings

602 Caterpillar Tractor Co., Peoria, Ill., has recently issued an attractive book giving a brief resume of the outstanding features of Caterpillar diesel engines as well as a discussion of the precision and quality materials used and maximum and rated performance curves of the seven current sizes of diesels made by this company. Copies of this booklet, Form 4253, may be secured direct from the manufacturer.

New Catalog On Mixers

603 Complete information including specifications and dimensions for all sizes and types of Koehring Dandie mixers, with photographs to illustrate the construction features and job pictures showing many applications of these mixers in construction, is contained in a new 12-page catalog recently issued by the Koehring Co., 3026 W. Concordia Ave., Milwaukee, Wis., which will be glad to send copies on request.

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Baker Bulldozer on Allis-Chalmers Tractor levelling fill on new West Side Express Highway on bank of Hudson River in New York City. Contractors, Elmhurst Contracting Co.

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Bulletins and Pamphlets

(Continued from preceding page)

Portable Wheeled Rollers

604 Littleford portable wheeled rollers, in tauck and motorized type, for rolling patches, curve widening, retreading or rolling brick or sub-bases, are described in Bulletin N-3, copies of which may be secured direct from Littleford Bros., 485 E. Pearl St., Cincinnati, Ohio.

Contractors' Tools

605 The Martin Hardsoog Co., 916 Shore Ave., Pittsburgh, Pa., will be pleased to quote contractors on a wide line of contractors' tools including wedges, sledges and track tools, crow bars, slate bars and spike bars, post-hole digging bars, clay picks, car movers, blacksmiths' sledges, etc.

Heavy-Duty ½-Yard Shovel

606 The Model 30 General ½-yard shovel, combining heavy-duty construction and high-speed mobility, is described in detail and illustrated in a new Bulletin No. 3802 which interested contractors may secure direct from the General Excavator Co., Marion, Ohio.

Road-Building Equipment

607 W. A. Riddell Corp., Bucyrus, Ohio, will send on request complete information on the Warco line of road-building equipment which includes pull and power graders, wheeled scoops and all-purpose portable road rollers.

Power for Construction Jobs

608 Bulletin 7E, describing Franklin Air-cooled power units for construction machinery, motor trucks or other heavy-duty applications requiring from 20 to 180 hp, may be secured without obligation from Air Cooled Motors Corp., 515 Madison Ave., New York City.

Vibrators and Grinders

609 White concrete vibrators and grinders in a variety of types and sizes are described in a circular which the White Mfg. Co., Elkhart, Ind., will be glad to send on request.

Finishing Machines

610 Flexible Road Joint Machine Co., Warren, Ohio, will send to those interested complete information on Flex-Plane finishing machines, joint installing machines and dowel rod spotters for concrete paving jobs.

Rubber Joint Filler

611 A new 4-page illustrated bulletin describing the Goodrich rubber joint filler for concrete highways and other types of concrete construction, with dimensional drawings of the various fillers and photographs showing the method of installation, has recently been issued by the B. F. Goodrich Co., Mechanical Rubber Goods Division, Akron, Ohio, which will be glad to send copies on request.

Added Truck Capacity

612 Thornton Four Rear Wheel Drive for all trucks, smallest to largest, to increase the load-carrying capacity and power with marked economy is described in literature which may be secured by those interested direct from the Thornton Tandem Co., 5155 Braden St., Detroit, Mich.

Catalog on ¾-Yard Shovel

613 Data on the construction features and performance of the Lorain-40 ¾-yard shovel are contained in a catalog which may be secured from the Universal Crane Division, Thew Shovel Co., Lorain, Ohio.

101 Uses For Wrought-Iron Pipe

614 This is the title of a very instructive 32-page illustrated booklet recently issued by A. M. Byers Co., Pittsburgh, Pa. Both designing and construction engineers will be surprised at the very wide use of wrought iron throughout many industries.

New Portable Bituminous Plants

615 The new Hetherington & Berner portable bituminous mixing plant, designed for use in secondary road work and which is easily transported from job to job on a standard flat-bed truck or trailer, is described in Bulletin T-250 which may be secured direct from Hetherington & Berner, Inc., Indianapolis, Ind.

Literature on Guard Rail

616 Resiliflex Road Guard which, according to the manufacturer, will receive the heavy blows of passenger cars and heavy trucks traveling at high speeds, absorb the shock and glide the vehicles back to the road safely, is described and illustrated in Bulletin 141 which may be obtained direct from the National Traffic Guard Co., Atlanta, Ga.

A New Black-Top Paver

617 The Foote Co., Inc., Nunda, N. Y., will be glad to send to interested contractors and state and county highway engineers complete information on the 1938 Adnun Black-Top paver which is now equipped with hydraulic controls.

Wire Rope in Construction

618 Information on the complete Bethlehem line of wire rope for construction jobs, including Purple-Strand dragline cable, Form-Set hoist line, and other types to meet heavy-duty requirements, may be secured from the Bethlehem Steel Co., Bethlehem, Penna.

Pneumatic Rock Breaker

619 The Atlantic Steel Co., 1775 Broadway, New York City, will send to those interested complete information on the Atlantic pneumatic rock breaker which utilizes regular air equipment for breaking up large or unwieldy rocks and boulders.

Four Sizes of Scrapers

620 Bulletin R135, describing Gar Wood hydraulically controlled dirt-moving scrapers in 6, 8, 10 and 12-yard sizes, may be secured without obligation direct from Gar Wood Industries, Inc., Road Machinery Division, Detroit, Mich.

Vibrators for Concrete

621 Electric Tamper & Equipment Co., Ludington, Mich., will send to those interested complete information on Jackson Hydro-Spade vibrators for the internal vibration of concrete.

Dirt-Moving Equipment

622 LeTourneau dirt-moving equipment, including rooters, bulldozers and Carryall scrapers, are described in literature which may be secured direct from R. G. LeTourneau, Inc., Peoria, Ill., and Stockton, Calif.

Curing with Calcium Chloride

623 Full technical data, reports and practical information on simple methods of using calcium chloride for concrete curing may be secured by interested contractors and engineers from the Calcium Chloride Association, Penobscot Bldg., Detroit, Mich.

Rivetless-Lip Dredge Buckets

624 The ten features claimed for Amsco rivetless lip dredge buckets are described in literature which the American Manganese Steel Co., Chicago Heights, Ill., will be glad to send on request.

Asphalt Emulsion Sprayers

625 Tarrant hand and power asphalt emulsion sprayers for use in road construction and maintenance are described in literature which the Tarrant Mfg. Co., Saratoga Springs, N. Y., will be glad to send on request.

Concrete Curing Mats

626 The outstanding features of New Haven road mats for curing concrete, which according to the manufacturer reduce curing time and costs to a minimum, are described in a bulletin which the Advanced Concrete Road Curing Co., New Haven, Conn., will gladly send to interested contractors and engineers.

Line of Electric Tools

627 The 1938 line of high-speed equipment manufactured by the Master Vibrator Co., Dayton, Ohio, including concrete vibrators, Airspeed electric tools, Master electric hoists and generator sets, and Packard AC arc welders, is described in literature which may be secured by those interested from this company.

New Portable Asphalt Plant

628 The new Cedar Rapids Speedline portable asphalt plant which is claimed to perform every essential operation for good bituminous construction and can easily be transported from job to job is described and illustrated in a new folder, copies of which may be secured from the Iowa Mfg. Co., Cedar Rapids, Iowa.

New Road Grader Catalog

629 The new Austin-Western No. 99 motor grader, which drives and steers on all four wheels and is designed to handle all grader operations of digging, cutting, spreading, mixing and backsloping quickly and economically, is described in a new Catalog 1710, copies of which the Austin-Western Road Machinery Co., Aurora, Ill., will be glad to send on request.

Chain-Drive Motor Trucks

630 Sterling chain-drive motor trucks, built to stand the gaff of heavy-duty operations and which have the added feature of wood-lined frames to absorb vibration and shock, are described completely in a new illustrated folder D237DJ, which may be secured from Sterling Motors Corp., Milwaukee, Wis.

• ROME •

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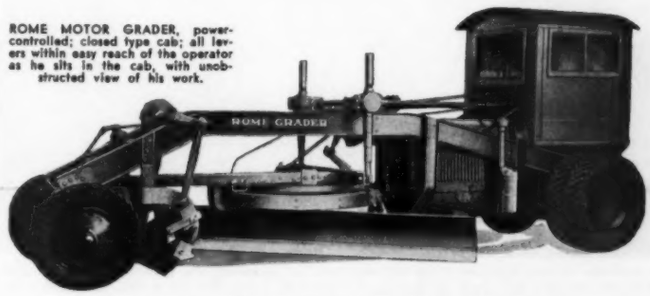

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Contractors and Engineers Monthly

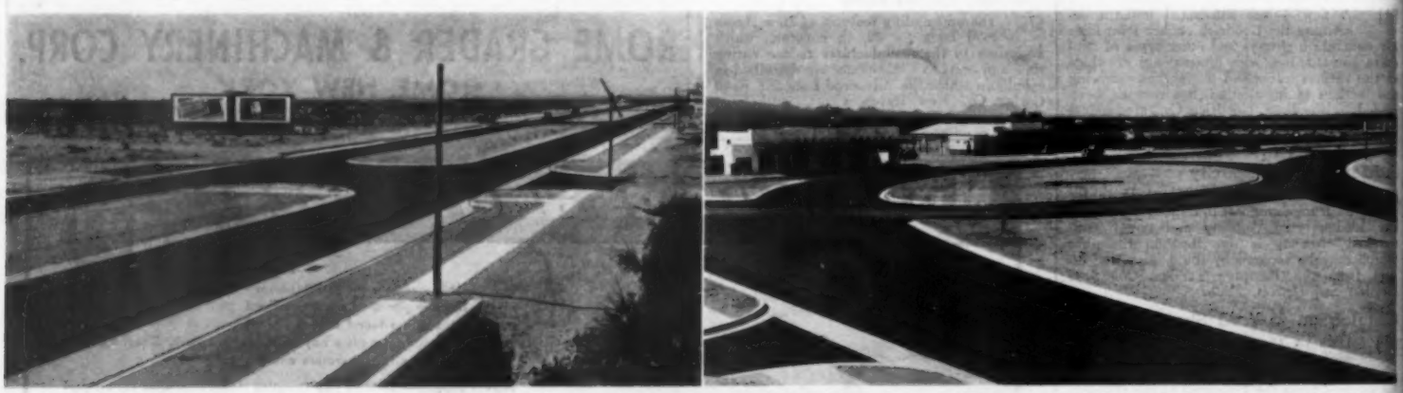
A Mountain of 6,000 Yards of Dirt Washed Down on Gould Avenue, Laurel Canyon, Hollywood, in California's Recent Flood. The Lorain ¾-Yard Machine Tackling the Job of Removal Is Owned by the Los Angeles Rock & Gravel Co.

A Scene on an Interesting Stabilization by Sub-Oiling Project in Missouri, Showing an RD7 Tractor, the Ingalls Sub-Oiler and the 750-Gallon Tank Truck Relaying Bituminous Material to the Sub-Oiler. See Page 12.

Placing Loam on the Raised Medial Strip on the C. J. Maney Contract for the Connecting Link Between the Revere Beach Boulevard and U.S. 1 at Saugus, Mass. The Truck Crane Rehandled the Loam Which Was Spread by the Grader. See Page 2.

A Feature of the Largest Road Grading Job in Mississippi's 1937 Highway Program Was the Amount and Type of Equipment Used by Chas. Weaver & Co., the Contractor. Included Were These Tractor-Carryall Outfits and Sheepsfoot Rollers. See Page 1.

Although Much of the Levee Work in the Atchafalaya Flood Basin Was Necessarily Done by Dredges, on Two Sections in Pointe Coupee Parish, La., Dameron & Kenyon Used this 6160 Bucyrus-Monighan Dragline. See Page 31.



Left, a Section of Arizona's Miracle Mile, Showing the General Scheme for Separating Traffic and, on the Right, the South Traffic Circle at the Tucson End of the Project. Traffic to and from the Popular Blue Moon Ballroom Was an Important Factor in Influencing the Design of This Circle. See Page 1.

Day and Night Views of One of the New Underpasses in Reno, Nevada, Constructed to Eliminate Dangerous Traffic Conditions, Which Is Lighted by Seven 10,000-Lumen Sodium Vapor Lamps. See Page 21.